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Air Pollution Emissions Inventory Systems Appendix D. Emissions Inventory in the Netherlands. A Report of the NATO/CCMS Pilot Study

NATO Committee on the Challenges of Modern Society, Brussels (Belgium)

Jul 79

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COMMITTEE ON
THE CHALLENGES OF
MODERN SOCIETY

AIR POLLUTION EMISSIONS INVENTORY SYSTEMS
APPENDIX D
EMISSIONS INVENTORY IN THE NETHERLANDS

Number 104

NORTH ATLANTIC TREATY ORGANIZATION

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16. ABSTRACT

This document is an appendix to report number 104; it gives a general overview of emissions inventory systems as well as methods used in the Netherlands.

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AIR POLLUTION EMISSIONS
INVENTORY SYSTEMS

A Report of the NATO/CCMS Pilot Study
on Air Pollution Assessment Methodology and Modeling

No. 104, APPENDIX D

Air Pollution Emissions Inventory Systems
used in The Netherlands

COMMITTEE ON THE CHALLENGES OF MODERN SOCIETY
NORTH ATLANTIC TREATY ORGANIZATION
(July 1979)

Preface

The North Atlantic Treaty Organization (NATO) established the "Committee on the Challenges of Modern Society" (CCMS) at the November 1969 meeting of the North Atlantic Council.

The CCMS was charged with developing meaningful environmental and social programs that complement other international programs, and with showing leadership, first, in solution of existing problems and, second, in development of long-range goals for environmental protection in the NATO sphere of influence and in other countries as well. A first Pilot Study on Air Pollution was initiated by the CCMS at its inaugural meeting in December 1969. The United States (Environmental Protection Agency) has been the pilot nation with the Federal Republic of Germany (Federal Ministry of the Interior) and Turkey (Scientific and Technical Research Council) as copilot-nations.

The Pilot Study on Air Pollution was an action program designed to demonstrate and encourage the utilization of existing knowledge for the development of air quality management programs. It entailed the demonstration of a system approach to air quality management. Case studies have been carried out in Ankara, Turkey; Frankfurt, Federal Republic of Germany; St. Louis, U. S.; Oslo, Norway; South Holland Region, The Netherlands (NATO/CCMS Report No. 6, Appendices A - E).

The results of the pilot study are documented in NATO/CCMS Report No. 6 (Revised) "Guidelines to Assessment of Air Quality" of October 1972 and in NATO/CCMS Report No. 33 (Final Report) containing 15 recommendations as well as in several other documents, listed as Annex II to this document.

Starting from three of the above recommendations (VI, VII and XIV) the Federal Republic of Germany proposed to initiate a new Pilot Study on Air Pollution Assessment Methodology and Modeling at the CCMS Plenary Session on October 22 and 23, 1974.

These NATO/CCMS Recommendations are:

RECOMMENDATION VI

Member nations will co-operate to develop standardized methods for emissions data storage and retrieval to support requirements in the conduct of national air quality management programs. The US National Emission Data System (NEDS) might serve as a model for a common international system.

RECOMMENDATION VII

Member nations will co-operate to develop standardized techniques for projecting emissions and predicting future ambient air quality.

RECOMMENDATION XIV

Member nations agree the CCMS modeling activity has shown that there is a widespread need for further international co-operation to accomplish the following tasks:

> Bring together model developers and air quality managers for exchange of ideas, discussion of users' needs and demonstration of modeling techniques.
>
> Standardize modeling techniques for specific air quality management applications and consider how computerized models might be made available for all users.
>
> Continue to review on-going air quality assessment studies.

In spring 1975 the North Atlantic Council approved the German proposal. The pilot study work started with the Federal Republic of Germany (Federal Ministry of the Interior) as pilot nation and the United States of America (Environmental Protection Agency) and Belgium (Service du Premier Ministre) as co-pilot nations:
A Working Group and two Panels were established with the following functions:

Assessment Methodology Panel

- Pursue and carry out Recommendations VI and VII
- Continue to review present and future assessment studies with respect to the application of assessment methodology.

Modeling Panel

- Develop standardized models for various air quality management applications.
- Develop programs to improve modeler/user communications in conjunction with the Assessment Methodology Panel and the Working Group.
- Continue as an information forum on new modeling concepts and techniques, organizing once a year international technical meetings on air pollution modeling and its application.

In addition the Working Group established an Ad-Hoc Group on Air Quality Management Systems to revise and update the NATO/CCMS Report No. 6 (Revised) 1972 by preparing a new document on "Guidelines to Air Quality Management Systems".

Another Ad-Hoc Group was set up for compiling a Glossary of Terms frequently used in assessment methodology, modeling and air quality management systems.

As an outcome of this Pilot Study on Air Pollution Assessment Methodology and Modeling the following NATO/CCMS documents are published (see also Annex III):

Air Quality Management System

- Guidelines to Air Quality Management System.

Assessment Methodology

- Air Pollution Emissions Inventory Systems
- Air Pollution Emissions Projecting

Air Pollution Modeling

- Introduction to Air Quality Modeling
- Uses and Needs for Air Quality Modeling
- Bibliography on Grey Literature on Air Quality Modeling, Part I (Applied Models)
- Bibliography on Grey Literature on Air Quality Modeling, Part II (New Modeling Techniques)
- Practical Demonstration of Multiple Source Urban Air Quality Modeling (Gaussian Plume)
- Fundamentals for the Applications of a Gaussian Plume Model

Other Publications

- Glossary of Terms
- Proceedings of the 6th to 9th International Technical Meetings on Air Pollution Modeling and its Application
  (6th Meeting, 24. - 26. Sept. 1975, Frankfurt/Main, Germany)
  (7th Meeting, 7. - 10. Sept. 1976, Airlie House, USA)
  (8th Meeting, 20. - 23. Sept. 1977, Louvain-la-Neuve, Belgium)
  (9th Meeting, 29. - 31. Aug. 1978, Toronto, Canada).

The chairman of the Working Group wishes to acknowledge the scientists participating from pilot, copilot, and observer countries, and the many other persons, who assisted in the preparation of this document.

The panel, which performed diligently throughout the course of this effort, receives the highest praise. The panel members were:

Federal Republic of Germany - Pilot Country

F. Gerold
K. E. Joerss
H. Meinl

Belgium - Copilot Country

R. Dams
C. de Wispelaere

United States of America - Copilot Country

R. Baumann
J. Bosch
J. R. Hammerle

Canada - Observer

P. J. Choquette

France - Observer

W. Challemel du Rozier

Norway - Observer

O. I. Skogvold

The Netherlands - Oberserver

L. H. J. Wachters.

The addresses of the panel members are listed in Annex I.

Full recognition is given to each panel member for carrying out and coordinating review and other activities related to the development of this document in his respective country and to Ms. C. Morawa of the Federal Environmental Office, Germany for her effort in coordinating and organising and for editorial work.

For the Working Group,
Erich Weber, Chairman.

The present document is an appendix to the NATO/CCMS document

AIR POLLUTION EMISSIONS INVENTORY SYSTEMS

No. 104, October 1978

which gives a general overview of the matter of emissions inventory systems as well as of the methods currently applied in BELGIUM, CANADA, the FEDERAL REPUBLIC OF GERMANY, The NETHERLANDS, NORWAY and the UNITED STATES OF AMERICA.

It contains documentations of air pollution emissions inventory systems currently used in

Belgium	Appendix A
Canada	Appendix B
Germany, F. R.	Appendix C
The Netherland	Appendix D
Norway	Appendix E
United States	Appendix F

Each appendix is bound as a separate volume

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Annex III NATO/CCMS Documents on the Pilot Study on Air Pollution Assessment Methodology and Modeling

Part I:

Emissions Inventory of Environmental Pollutants

In 1974 a beginning was made in the Netherlands with an inventory of emissions of air and water pollution and hard-to-process waste. A description is given of the methods and procedures used in this inventory, followed by a very brief discussion of the use of the collected data.

1. INTRODUCTION

Since the beginning of 1974, TNO[*] has been compiling an inventory of pollutant emissions. This project is carried out as contract work for the Dutch government. Emissions of air pollutants and discharges of waste water are recorded, along with quantities and destination of hard-to-process industrial wastes. The inventory includes not only emissions from industry, but also from non-industrial sources, such as traffic, shops, offices, households, agriculture, horticulture, and stock-breeding. Also emissions of natural origin are taken into account.

The purpose of the inventory is, after processing the collected data, to acquire a good insight into the manner and extent of environmental pollution. This should make it possible to achieve a more quantitatively based policy with respect to both pollution control and the planning of new industries, residential areas, highways, etc.

Of many emissions, type and magnitude are already known in some places, while for many others the magnitude can be relatively simply calculated or estimated. To support a national environmental policy, however, it is necessary that this kind of information is available in one place and arranged according to an easily accessible system. The very first goal of the Dutch emission inventory is therefore the systematic collection and sorting of information already known or easily available. Where this is not available, data are acquired by measurements.

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[*] Dutch Organization for Applied Scientific Research

In the following we will discuss the emissions inventory as it is set up in the Netherlands. After a summary of the scope and progress of the project, we shall discuss the inventory system, the organization and procedures used in data collection, the experiences gained so far, and finally the use of the collected data.

2. SCOPE AND PROGRESS OF THE INVENTORY PROJECT

The initiative for the emissions inventory was taken by the Dutch Ministry for the Public Health and Environmental Hygiene. As far back as 1972, a preliminary rough plan was set up in consultation with industry and TNO. Since a few years, also the Ministry of Public Works has been involved in the project. Provincial, regional, and municipal agencies are also co-operating.

Broadly speaking, the project includes the following steps:

a. Evaluation of the inventory system developed in Germany by TÜV Rheinland e.V.* for air pollution emissions, i. e.
   - evaluation of the method of data storage, handling and retrieval
   - evaluation of the data acquisition methods

---

* Technischer Überwachungs-Verein Rheinland e.V., Cologne

b. Setting up a plan of procedure for the inventory along with proposals as to
   - organization
   - way of approaching industry and local authorities
   - security measures,

   all based on the experience gained in Germany and on possible special requirements for the Netherlands.

c. Adaptation of the German system for use in the Netherlands. This meant simplification in regard to emissions recorded individually, and establishment of a new system for recording emissions for which individual recording would be too expensive or even senseless.

d. Extension of the inventory system to include discharges of waste water and hard-to-process industrial wastes.

e. Performing a test-inventory in the southern half of the province of Limburg and evaluation of the results.

f. Continuing the inventory for the whole country, starting with the densely populated and highly industrialized provinces in the western part of the Netherlands.

g. Regular updating of the collected data.

Of the above steps, the first two were carried out in the Spring of 1973. Next, a beginning was made on adapting and extending the German inventorying system. The system for the individual recording of industrial emissions of air and water pollution was ready by the beginning of 1974. The test inventory in South Limburg was then started in April 1974 and completed according to plan in December 1974.
In February 1975, the inventory was continued in the western provinces. The first round through the whole country is expected to be ready by 1980.

The preparation of the required computer programs for the inventory system has been delayed somewhat. The main reason was that an extensive study was needed for the design of a system for the inventorying of non-industrial waste water emissions and their impact on sewage facilities and the surface water.

An indication of the size of the inventory is obtained by the figures for South Limburg, South Holland, and the entire country, presented in Table I. It is shown that a large number of industrial plants should be visited individually. These visits must be performed by persons that are not only familiar with the type of operations in a particular industry and the emissions to be expected there, but also with the prescribed method and procedures of the inventorying system. The latter is absolutely necessary to warrant uniformity in the inventory. Only then is a real comparison possible between emissions from various plants, branches of industry, locations, etc.

TABLE I. SCOPE OF THE EMISSIONS INVENTORY

	Test area in S. Limburg	Provice of S. Holland	Netherlands
Number of inhabitants	610,000	3,020,000	13,500,000
Area (square km)	690	3,326	41,160
Number of industrial plants to be inventoried:			
- by visit	170	700	3,000
- by telephone	-	1,970	7,000
Number of atmospheric emissions to be individually recorded	3,500	25,000	110,000*
Number of waste water emissions to be individually recorded	630	8,000	30,000*

* Estimate based on the number of companies in the various branches of industry and on the figures from South Limburg.

3. THE EMISSIONS INVENTORY SYSTEM

3.1 Objectives

In setting up the emissions inventory system, the starting-point has been the requirement that of all emission of air and water pollution in the Netherlands information should be collected and registered needed for:

- acquiring an overview of all emissions with a specification as to their type and amount, origin, location, time, emission height (for air polluting emissions), destination (for water polluting emissions), and responsible agency.
- comparison of the emissions or groups of emissions.
- calculation of the effects on air and water quality.

Later the requirement was added that also information must be registered needed to obtain an insight into all sewage transport and treatment facilities.

3.2 Collective and individual approach

In many instances it is possible to determine emissions of air and water pollution in a collective way, i. e. by means of statistical data and emission factors. For example, if one knows for each square kilometer the number of dwellings in which space heating is done by natural gas, and also the amount of nitrogen oxides that are emitted per dwelling from natural gasburning, then the emission of nitrogen oxides per square kilometer from these dwellings can be calculated. In this way the emissions from the following sources can be found:

- dwellings, minor industry, shops and offices,
- traffic on roads, waterways, railways and by air planes,
- agriculture, horticulture, cattle breeding and natural processes.

In all these cases one has to do with a large number of similar but individually small emissions. This makes that the collective approach is justified.

For the inventory of emissions from large industrial facilities a collective approach is not feasible. If one wants more than just a rough estimate, then each individual plant and installation, and in some cases even each piece of apparatus, should be investigated. Sometimes it is hard to draw a line between facilities that should be registered individually and those that can be treated collectively.
In the emission inventory in The Netherlands, we follow the rule that plants with more than 10 employees are all registered individually, provided that they belong to industrial branches with really industrial emissions, i. e. emissions other than those from space heating and ordinary sanitary facilities. Emissions from smaller plants are only registered individually when they belong to branches with very polluting activities, such as foundries and galvanic operations.

It was mentioned in par. 3.1 that for each emission location and time should be registered. Location is in the Dutch emissions inventory always indicated by the kilometer square of the Dutch Triangular Network System. Of individually registered emissions the location of the emission is given in co-ordinates with a possible precision of ± 10 meters. Of collectively registered emissions the location is given by the kilometer square, while in most cases a further refinement is used by indication of a quadrant or a group of quadrants in the kilometer square, and by indicating the municipality and - for water emissions only - the water run-off area and the water quality authority region.

Time is indicated for the individually registered emissions by presenting the month, the day of the week, and the hour of the day. If an emission is not continuous during the indicated months, days or hours, the duration and frequency of the emission periods is also given. For the collectively registered emissions only the month and the day of the week are given.

3.3 Data Storage and Handling System

All data on air and water polluting emissions are stored in a data base containing 26 different data files divided over five subsystems:

a. Individually registered emissions

b. Collectively registered emissions

c. Sewer systems, sewage pipe lines and pumping stations, and sewage treatment plants

d. Water run-off areas

e. Auxiliary data

A structure diagram of the whole system is shown in Figure 1. Six levels of data can be distinguished:

I. Responsible agency, e. g. the management of an industrial plant, the owner or supervisory agent of a sewage transport or treatment facility, or the local authorities in a certain municipality or region.

II. Origin of the emission(s), e. g. an installation or piece of apparatus in an industrial plant, a sewage facility, a water run-off area (which drains pollutants into other water run-off areas), the dwellings in a certain kilometer square, the traffic on a certain road, etc.

III. Source of the emission(s), i. e. the opening through which a pollutant leaves its origin and enters into the environment (atmosphere, surface water, or ground) or a sewage facility.

IV. Basic information, i. e. information on the size of a polluting activity or entity from which, with the help of an emission factor, an emission can be calculated, such as the amount of fuel burnt per hour or per day, or the number of cars counted on a highway per day.

V. Emission factory, i. e. data on the emission per unit activity or entity, such as the amount of nitrogen oxides emitted per m^3 of natural gas burnt in a given type of furnace.

VI. Emissions. These can either be entered directly into the system or be calculated through basic information and emission factors.

The various files show a certain hierarchy, which is shown by the arrows in Figure 1. For instance, each plant registered in the plant file has one or more installations, one or more sources, and one or more emissions. On the

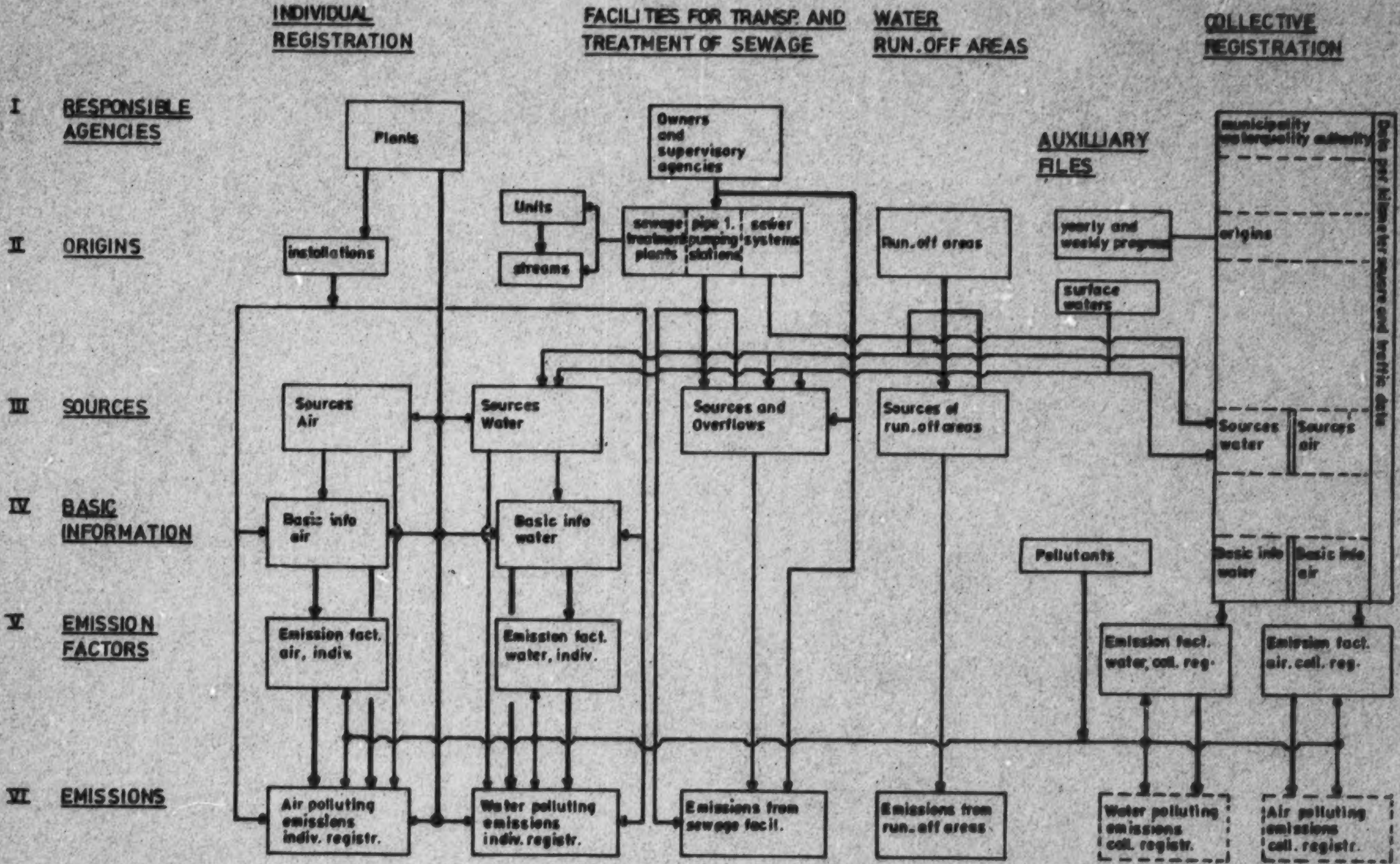
INDIVIDUAL REGISTRATION
FACILITIES FOR TRANSP. AND TREATMENT OF SEWAGE
WATER RUN.OFF AREAS
COLLECTIVE REGISTRATION
AUXILLIARY FILES
I RESPONSIBLE AGENCIES
II ORIGINS
III SOURCES
IV BASIC INFORMATION
V EMISSION FACTORS
VI EMISSIONS
Plants
Owners and supervisory agencies
Units
streams
installations
sewage treatment plants
pipe 1. pumping stations
sewer systems
Run.off areas
yearly and weekly program
surface waters
municipality waterquality authority
origins
Data per kilometer square and traffic data
Sources Air
Sources Water
Sources and Overflows
Sources of run.off areas
Sources water
Sources air
Basic info air
Basic info water
Pollutants
Basic info water
Basic info air
Emission fact. air, indiv.
Emission fact. water, indiv.
Emission fact. water, coll. reg.
Emission fact. air, coll. reg.
Air polluting emissions indiv. registr.
Water polluting emissions indiv. registr.
Emissions from sewage facil.
Emissions from run.off areas
Water polluting emissions coll. registr.
Air polluting emissions coll. registr.

Fig. 1 Structure diagram of the Dutch Emission inventory system

other hand, an installation cannot belong to more than one plant. Installations are therefore considered to be of a lower order than plants. In the same way are emissions of a lower order than plants, installations, sources, basic information, and emission factors, since an emission always belongs to one plant, one installation, one source, and - if the emission is obtained through an emission factor - one piece of basic information and one emission factor.

Sources are always the connection points either between the origin of an emission and the environment or between two facilities. In the source file it is therefore indicated from which facility or area a given emission of water pollution originates and to which facility or area it goes.

The contents of the various files is summarized in tables a through e in the Appendix. Note that several files shown separately in Figure 1 are actually combined in one file (see e. g. the emission factor files for air and water pollutants). On the other hand, the actually separate files with traffic data and data on dwellings, etc. have in Figure 1 been combined to one box.

For the inventory of data on waste materials a system is used developed by the Dutch Institute for the Removal of Waste Materials (SVA). Data are collected on the origin of the waste, the type of waste and its destination.

4. ORGANIZATION OF THE PROJECT

4.1 Consultative Structure

In view of the large number of companies and agencies involved in the project, from the very beginning provision was made for a good consultative structure. The most important part of this is shown in Table 2. The Steering Committee, consisting of representatives of the two ministries involved in the project, the provinces, industry, and TNO, functions as a forum in regard to the national policy concerning the emissions inventory. A Regional Committee is formed for each province where the inventory is currently being made, and deals with the more regional aspects.

The Work Consultation Group exists at the operational level. This is the meeting-ground for the technical people of both the ordering and the delivering agencies, the latter being the agencies responsible for collecting and processing of the emission data. The most important task of this group has been the overall design of the inventory system.

At the monthly progress meetings, representatives of the agencies involved in the inventorying of industrial emissions discuss the progress of the work and possible modifications in the planning. Also questions are brought up requiring a decision from the Regional Committee or the Steering Committee. In addition to these broad progress meetings, there are regular progress meetings on a smaller scale at various levels inside TNO.

Finally an "Emission Factor" Steering Committee has been set up along with a number of working groups. Their task involves the collection and evaluation of emission factors to be used in various branches of industry and other sources. Members of the working groups come from industry, governmental agencies and TNO.

TABLE 2. CONSULTATIVE STRUCTURE IN THE EMISSION INVENTORY PROJECT

	Policy		Execution	
	Steering Committee	Regional Committee	Work Consultation Group	Progress Meetings
Dept. of Public Health and Environmental Hygiene:				
Dir.-General Environ. Hyg.	x			
Chief Inspector " "	x	x	x	x
Regional Insp. " "		x		
Computer Department			x	
Dept. of Public Works:				
Central Directorate	x			
Regional Directorate		x		
Inst. of Waste Water Purification			x	
Provinces, Municipalities, Water quality authorities:				
Deputy for Envir. Hygiene	x			
Provincial Publ. Works Dept.		x	x	x
Regional Environ. Services				x
Municipal Nuisance Act Depts.				x
Water Quality Authorities		x	x	
Business Community	x	x		
TNO:				
TNO Directorate	x			
TNO Project Leader	x[1]	x	x	x
TNO Section and Team Leaders				x

---

[1] Has no formal seat in this Committee.

4.2 Collection of Emission Data

Data for the individual inventory are gathered by individually approaching all companies falling in this category. These companies receive first an introductory letter from the Chief Inspector of Public Health in charge of Environmental Hygiene, in which their co-operation is requested. Companies that are rather complicated from the environmental point of view are then visited by a TNO inventorying team. Depending on the size and type of the company, the visit may take from a few hours to a whole year. Environmentally simpler companies are interviewed by telephone.

In determining emissions, use is made as far as possible of

- data already known in the company from measurements (including those made by agencies responsible for the enforcement of the environmental protection laws).
- material balances for factories or sections thereof.
- emission factors obtained by measurement or calculation from similar installations or apparatus.

Where this is not possible, and the amount of the emissions justifies it, measurements are taken. As discussed in 3.1, of each emission not only type, amount, time, and location are recorded, but also information relating to the (production) process that causes it, and the manner in which the emission reaches the environment. The purpose of this is to obtain a good insight into the type and magnitude of emissions that may be expected from the various categories of processes and apparatus.

Individual inventorying in South Limburg occupied seven TNO teams of two experts each for about half a year. Later, the number of teams was extended to 16. For the supervision of these teams, 6 academic-level team leaders were assigned. In addition to the inventorying teams, several measurement teams are on call for taking measurements where needed. The entire project is directed and administered from a local office specially set up for the inventorying in a particular province.

Both during the introduction to the various companies and during the actual inventorying, the TNO-teams are as far as possible accompanied by local authorities charged with either the administration of the Air Pollution Control Act or the Public Nuisance Act. These officials also assist in the final checking of the data collected.

In view of the confidential character of much of the data a great deal of attention has been paid in this project to security. To this end a number of special rules have been established for the inventory personnel. In addition, everyone taking part in the project signs a special secrecy agreement. Special regulations have been issued with regard to the handling of questionnaires and other confidential material.

The collection of data on emissions inventoried collectively is accomplished by a group of varying composition. For the execution of its task it has to approach a large number of agencies in Holland. Data on population, number of workers, etc. are available from the Central Bureau of Statistics and the State Planning Service. Figures on land use, etc. are obtained from topographical maps, filled in with data obtained from local authorities. Also for data on sewage transport and treatment facilities much help is needed from the local authorities.

The figures for calculating the various emission factors used in the collective inventorying are derived from a number of studies at home and abroad. It is intended to continue improving the accuracy of these emission factors through further study as well as through measurements.

4.3 Storage of Emission Data

During their collection all data are immediately filled out on punch formats. After careful checking and screening, the data are put on disk and tape at the computer department of the Ministry of Public Health and Environmental Hygiene. Of the emissions of each individually registered industrial plant a printout is then sent to the plant management and the local environmental agencies for air and water pollution with the request for a careful checking. Only after the data have been approved, they can be used for calculations, summaries, etc.

The questionnaires dealing with hard-to-process waste go to the Institute for the Removal of Waste Materials (SVA).

It will be clear that also with respect to the data storage and processing the necessary secrecy measures are taken.

4.4 Experience

With regard to the method of registration, it can be said that the experience to date has been favourable.

In collecting information from industry mostly very good co-operation has been obtained. Small companies showed sometimes at the beginning a certain reserve toward the inventorying. This was mainly caused by fear of having to spend much employees' time. When it became clear that this was not going to happen, they were usually very co-operative in finding the requisite information, such as process charts, data about apparatus, purchasing data, and measurement records.
In some cases it turned out that the announcement of the emission inventory had a salutory effect by itself. And for many companies especially the smaller ones, the results of the TNO inventory team came as a revelation to management.

In collecting data from the non-industrial sectors of society, there was excellent co-operation pretty much everywhere. A large number of agencies in the country are now contributing to this part of the inventorying. Many experts from these agencies have also given advice concerning the systems design.

5. USE OF THE INFORMATION COLLECTED

As mentioned before, the purpose of the inventory is to gain information in order to reach a sound environmental protection policy. This policy concerns not only pollution abatement but also the new establishment and expansion of industries, residential areas, and highway systems. In order to achieve this purpose, summaries are prepared from the information stored in the various data files. Emission summaries are made not only per company but also per type of installation, per branch of industry, per municipality, per province, etc. Summaries are further prepared of air pollution emissions per square kilometer. From this a picture is obtained of the distribution of the various kinds of emissions in a given region. Air pollution dispersion models are then used to determine the effects on air quality.

For water pollution, the load on the surface water in the various water run-off areas is needed. Also here models are needed to calculate the effect of the various emissions on the environment.

Since in the inventory also the emissions expected in 3 years from now are registered, an impression of the future situation can be obtained by using these data in the models.

It is obvious that much of the information collected from industry is of confidential character. Consequently the greatest caution is observed in regard to distribution of the results of the inventory. These results are therefore available to only a limited number of persons. The rule is that data on industrial emissions are only provided to environmental protection agencies and that these agencies have only access to data of companies that fall under their direct authority. It is further agreed that the data can at most be used as evidence that an operating license should be revised. They may not be used to set maxima or maximum averages for emissions in a license. This is because the individual data are often only the result of rough estimates and therefore not reliable enough. For the purpose of a national emission inventory this does not matter so much. It would not be just though to found maxima in licenses on them. For the same reason it is agreed that the emission data may not be used for the assessment of pollution levies.

Agreements also exist with regard to publication of summaries compiled from the data. Thus for the present, publication must be limited to calculated overall imission patterns, and overall emissions for modules of not less than 3 by 3 sq. km. This is to make it impossible to deduce from such publications data on emissions from individual plants.

6. A FEW CONCLUSIONS

On the basis of experience gained so far, the following conclusions can be drawn:

- The Dutch emission inventory has so far proceeded without serious difficulties.
- The success of a project such as the present one depends to a great extent upon a sound consultative structure.
- Because of its integral character, the project deals with collecting environmental information from a large number of different agencies and specialists. The resulting multitude of contacts among these agencies and specialists will undoubtedly help to provide a basis for an integrated environmental policy.

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Addendum:

Contents of the Data Files of the Emissions Inventory System

Table a. **Data on collectively registered emissions**

File	Contents
Data per kilometer square (from dwellings, local traffic, minor industry, agriculture)	Kilometer square, quadrant(s) of kilometer square, municipality, water run-off area, local water quality authority, height of ground above sea level, soil type, average number of persons per dwelling, emission source (= origin of the emissions), size of emission source (e.g. the number of dwellings in the area defined, the area planted with a certain crop, or the number of workers in a certain type of minor industry), type of destination of waste water (sewer, surface water, or the ground), receiving sewer system or run-off area, receiving surface water, water quality authority of receiving area.
Traffic data (per traffic route, such as a major road, a railway or a waterway, or per traffic area, such as an airport, a port or a railway yard)	Route number or route name of area, kilometer square, quadrant(s) of kilometer square, municipality, water run-off area, local water quality authority, height of ground above sea level, length of route, month(s) of the year and day(s) of the week during which emission occurs, type of traffic or related emission source, quantity of traffic or related emission source, type and quantity of pollutant emitted into air or water (registered where application of emission factors is not feasible), type of destination of waste water (sewer, surface water, or the ground), receiving sewer system or run-off area, receiving surface water, water quality authority in receiving area.
Emission factors	Type of emission source, month(s) of the year and day(s) of the week during which emission occurs, emitted pollutant(s) and quantity of it per unit activity or entity (= emission factor), type of destination (air or water), height of the emission above ground level (for air pollutants); origin, reliability and date of introduction of emission factor.
Country border (to be used for calculating effects from border transgressing emissions)	Kilometer square, length and direction of border line in kilometer square.

Table b. Data on individually registered (industrial) emissions

File	Contents
Plants	Industrial branch, name of plant, address, number of workers, municipality, province, authorities responsible for enforcement of environmental protection laws.
Installations (and apparatus)	Plant, type of installation (and apparatus), number of equal installations or apparatus, nominal (production) capacity, location (in co-ordinates), name.
Air polluting sources (= stacks and other openings)	Plant, type of source, name, location (in co-ordinates), height of ground above sea level, heigt of emission above ground level, area of opening, municipality.
Water polluting sources (= openings through which waste water drains into sewer, surface water or the ground)	Plant, type of source, name, location, local water quality authority, receiving surface water, destination (water run-off area, sewer system, or other plant), municipality.
Air polluting emissions	Plant, installation (and apparatus) causing the emission, source through which emissions leave the plant, emitted pollutant, state of aggregation of pollutant, percentage of nominal (production) capacity of the installation or apparatus at which emission occurs, emission per hour or basic information from which by use of an emission factor the emission can be calculated, standard deviation, volume flow or basic information from which by use of an emission factor the emission can be calculated, standard deviation, emission expected 3 years from now, temperature, special conditions, frequency and duration of emission periods and time during which they occur, type of gas cleaning equipment and efficiency of it, way of data acquisition.
Water polluting emissions	See "Air polluting emissions" (with the exception that gas cleaning should replaced by waste water treatment).
Emission factors	Type of basic information, destination (air or water), industrial branche, type of installation (and apparatus), type of air pollution source, special conditions, type of gas cleaning, type of waste water treatment, temperature (of gaseous emissions), name of process, date of introduction, state of aggregation, pollutant, pollutant grouping, emission factor for mass flow, emission factor for volume flow, unit in which basic information should be expressed, standard deviation of emission factor, origin and reliability of emission factor.

Table c. **Data on facilities for transport and treatment of sewage**

File	Contents
Owners and supervisory agencies	Name, address, municipality, province, type, total number of dwellings connected with a sewer system, number of dwellings still to be connected in total and in coming 3 years, number of dwellings not to be connected and number of them with adequate facilities for sewage treatment.
Sewer systems	Owner, supervisory agencies, municipality, type, name, type of data (existing or planned system), period of construction, biological load (number of people, and number of population equivalents from industrial facilities, recreational facilities and others), dry weather flow per day and maximum of it per hour (with a specification as to population, industry, recreational facilities, and leakage), impervious surface area, drainage coefficient, rain intensity, total static and dynamic capacity, drainage capacity, type of destination of sludge, year of latest adjustment, expectations on extension etc., type of facilities still to be connected.
Pipe lines and pumping stations	Owner, supervisory agency, type of pipe line or pumping station, name, type of data (existing or planned facility), year of construction, minimal and maximal pumping capacity and corresponding number of pumps in operation (only for pressure lines and pumping stations), type of grid and destination of collected dirt (only for pumping stations), drainage capacity (only for free drainage lines), length and diameter of possibly different line sections, expectation as to extension etc.
Sewage treatment plants	Owner, supervisory agency, address, municipality, province, location (in co-ordinates), type of data (existing or planned facility), year of construction, design specifications (as to biological load, dry weather drainage, maximal capacity and effluent quality), functions present and expectations on them as to extension etc.
Unit operations in sewage treatment plants	Owner, supervisory agency, sewage treatment plant, type of unit, number of parallel units of the same kind, year of construction, type of cover (in connection with air pollution), place in the plant as to settling and /or biological treatment, design specifications (volume, surface area, biological load, maximum capacity), functions present and expectations on them as to extension etc., added chemicals.
Streams in sewage treatment plants (i.e. flows entering and leaving, and between units)	Owner, supervisory agency, sewage treatment plant, unit from which stream leaves, unit into which stream enters, type of flow, flowrate.

Sources (= drainage points) of facilities for transport and treatment of sewage	Owner, supervisory agency, facility, type of drainage point, number of combined drainage points, municipality, location (in co-ordinates), type of data (existing or planned), receiving facility or water run-off area, receiving surface water, water quality authority at the drainage point, expectation as to extension etc.
Emissions (only measured emissions) of facilities for transport and treatment of sewage	Owner, supervisory agency, facility, source (=drainage point), month(s) of the year and day(s) of the week during which emission occurs, emitted pollutant, concentration of pollutant, standard deviation of concentration, expectation on emission after 3 years, volume flow, standard deviation of volume flow, expectation on volume flow after 3 years, origin of data, way of data aquisition.
Overflow points of facilities for transport and treatment of sewage	Owner, supervisory agency, facility, type of overflow, number of overflows taken together, municipality, location (in co-ordinates), type of data (existing or planned), average overflow frequency, overflow with showers with frequency of once in 2 and 10 years, way of data acquisition, receiving sewer system or run-off area, receiving surface water, water quality authority, expectation as to extension etc.

Table d. Data on water run-off areas

File	Contents
Names of water run-off areas	Name, surface area
Sources (=drainage points) of water run-off areas	Water run-off area, type of drainage, name of drainage point, location (in co-ordinates), receiving water run-off area, receiving surface water, water quality authority at the drainage point.
Emissions of water run-off areas	Water run-off area, source, code of measuring site, emitted pollutant, month(s) of the year and day(s) of the week during which emission occurs, concentration of pollutant, standard deviation of concentration, volume flow, standard deviation of volume flow, way of data acquisition

Table e. Auxilliary data

File	Contents
Progress during the year and the week	Type of emission source, nationally uniform progress in time of the size of an emission source or an emission factor expressed as precentages per month of the overall year emission and as percentages per day of the week of the overall week emission
Surface waters	Type of surface water, name, location
Pollutants	Name, grouping; polluting properties as to odour, toxicity, pollution, and corrosiveness; atomic composition of molecule (not for mixtures).

Part II:

Manual for the Data Collection on Individual Sources of Air and Water Pollution

Preface

This document is a translation of the manual issued by the Dutch Ministry of Public Health and Environmental Hygiene for the collection of data on individual sources of air and water pollution in the Dutch Emissions Inventory Project. The manual was written by the Dutch Organization for Applied Scientific Research (TNO), which also developed the inventory system in close co-operation with the Ministry of Public Health and Environmental Hygiene, the Ministry of Public Works and several other agencies in the field of environmental hygiene. Extensive use was made of the air pollution emissions inventory system developed in Germany by TÜV Rheinland e.V. for the state government of North Rhine-Westphalia.

The system for individual sources of air and water pollution is a subsystem of the total Dutch Emissions Inventory System and deals only with the emissions from major industrial plants*. For a review of the total system and for a description of the whole emissions inventory project, the reader is referred to the paper "Emissions Inventory of Environmental Pollutants in the Netherlands" (Part I - Netherlands).

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* Recently the facility for calculating emissions from emission factors and basic data on equipment or process parameters was added to the subsystem. Instructions on this feature have not been included in this translation.

1. PURPOSE AND SCOPE OF THE EMISSION INVENTORY SYSTEM

The purpose of the emission inventory system is the collection of information on emissions of air and water pollution. This information is valuable for the establishment of a policy concerning the reduction of environmental pollution, as well as concerning the expansion and new development of industrial plants, residential areas, agricultural activities, and highways. As a result, not only data on the nature and quantity of the emissions are collected, but also their causes (an installation or an apparatus), their location, and the manner in which they enter the environment (the source).

To a certain degree, the system is similar to the one developed by TUV Rheinland e.V. in Cologne. In order to enable a simple handling of the data, the system uses seven data files.
Each of these data files contains a collection of data pertaining to one major aspect of the emissions. The data files are:

1. The plant file, which records data on the location, nature and magnitude of those plants with installations which could lead to environmental pollution. Each establishment with its own independent operation is recorded in this file as a separate plant.
2. The pollutant file, which records data on a number of properties of the pollutants that are released into the environment.
3. The installation and apparatus file, which records data on the nature, capacity and location of the installations and apparati which produce emissions. An "installation" is considered here to be a technical process (a unit whose function it is to produce a finished or semi-finished product), while an "apparatus" is to be considered as a piece of equipment within such an installation.
4. The two source files, which record data on the nature, size and location of those orifices through which emissions of air or water pollution pass into the atmosphere or into the surface

water (or, in the case of so-called indirect waste water discharges into sewage systems or waste water purification installations).

5. The two emission files which record data on the nature, magnitude, duration and frequency of emission of air and water pollution. At the same time, the file indicates by what installation in the installation file the emission is produced as well as through what source in the source file it escapes into the environment (or into a sewage system or water purification installation).

The inventory system is so arranged that installations (or apparati) and sources can be handled as separate and independent entities. This means that a source is not included in any installation (or apparatus), but operates as an independent entity within the plant. This is necessary because emissions in many cases can be produced by several independent installations at the same time, and yet still can be released into the environment through the same source. The reverse may also occur.

Summarizing, one can say that:

- an emission is the release of any environmentally polluting matter.
- the cause of an emission is always an installation or, as the case may be, an apparatus within an installation.
- the orifice through which the emission passes into the environment or into a sewage system is called a source.
- for every emission, the cause (the installation or the apparatus therein) and the orifice (the source) is recorded. On the other hand, installations, apparati, and sources not giving rise to any emission are not recorded.

In order to be able to compare and analyze later the data collected in the various files, it is essential that these be arranged in a concise form. Therefore, the data concerning emissions, sources, installations, pollutants and plants have been divided into categories. As an example, in Appendix 3.H all installations which can be encountered in industry have been included in a number of categories each of which has a code number to enable an easy analysis by computer. These categories are unambiguously determined, and while inventorying one should always attempt to fit the collected information into this coding system. If that should not be possible, consultation with the project directorate should be made so that, if necessary, an extension of the code list under question can be made.

The inventorying of plants, installations, apparati, sources and emissions is done on the questionnaire forms in Appendix 1. All requested information must be legibly filled in, in pencil. At the same time, as much as possible, fundamental data, such as names of pollutants, quantities of fuel, and any calculations should be given on the questionnaire or on an attached sheet. After completion of the questionnaire, it should be dated by the data collector. The data should then, after careful examination, be presented to the appropriate group leader. He will check the questionnaires once again and then initial them. Finally, the forms, together with all other pieces of information such as maps, block diagrams, calculations, etc., should be submitted to the project directorate. After a final check, all documents are sent to the Minister of Public Health and Environmental Hygiene.

The inventorying of the pollutants is done by the project directorate using the computer card format shown in Appendix 2.

In the following pages, detailed instructions are presented for the completion of all data sheets. In order to obtain an accurate emission inventory, it is extremely important that the data collector follow these instructions precisely.

2. INSTRUCTIONS FOR THE COMPLETION OF THE DATA FORMS

The following instructions must be followed carefully to ensure the system's internal consistency. By doing this, later corrections and extra effort can be avoided.

All questions on the data forms must be answered, insofar as this is required by the appropriate instructions. Any data forms that are not completed in full without adequate explanation will be returned to the data collector.

2.1 THE PLANT FILE

The data sheet for this file is the first form that should be completed by the recording team on its visit to the plant. Each separate establishment of a plant, i.e. each geographically separate unit, must be recorded as a separate "plant."

Plants which have no emissions particular to its operation, i.e. their only emissions arise from heating equipment, toilets, etc. need not be individually recorded. They will be inventoried collectively on the basis of the number of their employees. In order to indicate whether these plants have been included, a data form must still be completed for control purposes. No plant number need be recorded.

For the recording of emissions in and around harbors the following directives must be followed:

1. Maintenance activity on ships

   Emissions resulting from maintenance activities on ships, berthed at a plant, must be recorded for the plant in question, if the plant (such as a dockyard) carries out these activities itself or commissions them to be done (for this latter case see the directives under "subcontractors"). If it is a question of activities carried out under the responsibility of the ship's officers, then the emissions will be included under the "collective inventory."

2. Loading and ballasting of ships

   Emissions resulting from the loading and ballasting of ships, berthed at a plant, must, as far as possible, be recorded for the plant in question, but under a separate plant number with the name "harbor" together with the name of the plant. Thus the loading or ballasting of ships in the harbor of the XYZ Refinery must be recorded under a plant name of "XYZ Refinery (harbor)" together with a plant number different from that of the XYZ Refinery itself. For plants which could have this activity it is advisable to ask the project directorate to reserve a plant number consecutive to that for the plant itself. This will make it more convenient later to retrieve the various plant numbers from the data file.

3. Unloading of Ships

Emissions resulting from the unloading of ships at a plant usually occur in the plant itself. They must then be recorded for that plant. If they occur on the ship, then they are to be treated as in point 2.

4. Cleaning of Ships

Emissions resulting from the cleaning of ships must always be attributed to the cleaning plant if the activities relate to a cleaning firm. If the cleaning activities are only auxiliary to the plant's own operations, then they should be recorded for the plant itself, but under a separate plant number with the notation of "(harbor)" together with the name of the plant in question (see point 2).

If desirable, emissions resulting from activities at a plant from the collective activity of subcontractors may be recorded under a separate plant number with the notation "(subcontractor(s))" after the name of the plant in question (N.B. do not give the name of the subcontractor).

It may happen that employees of a firm to be covered by the "collective inventory" are working on the site of a firm that is individually recorded. In such cases the boiler installation for space heating must still be completely included. The number of personnel working in the firm to be covered by the "Collective Inventory" should be reported to the "Collective Inventory Section", if this number is greater than 25.

The following rules must be followed with the completion of the questionnaire forms:

1. Card Code

   For the plant file the card code is 39001.

2. Type of Modification

   If the following data has never been included in the computer file, put in the value 1. If the data is to update data already in the file and put there at an earlier date, put in the value 2. If data is to be removed from the computer file, put in the value 3. In the cases of modification of the existing file, all data must be resubmitted. For the cases of removal from the file, only points 1 to 3 inclusive need to be completed.

3. Plant Number

   This 6-digit number is provided by the project directorate. If necessary, as in the case of harbor activities and of activities carried out by subcontractors, extra numbers should be requested. As far as possible, these numbers should be consecutive to the number of the plant itself.

4. Plant Function

   The code for this is given in Appendix 3.B and is the standard plant function code SBI-74 generated by the Central Bureau of Statistics (CBS). For activities in harbors and by subcontractors the same function code is recorded as for the concern itself.

5. Name

   Give the official company name. If the plant is a subsidiary of a larger concern, give in parentheses also the name of the parent organization. For harbors and subcontractors, refer to the directives given in the earlier points.

6. Address

   Give the street address of the site or, if necessary, the postal address. If the street address is never used, give the postal box number. For harbors and subcontractors fill in the same address as for the plant itself.

7. Town

   Give the town appropriate to the site or its postal address, including if necessary, the name of the province.

8. Number of Employees

   Give the number of employees in the plant. For harbor activities, the value 'nil' must be given. For subcontractor activities, the average number of workers employed and present on the part of the subcontractor should be given unless they have already been included in the number of employees of the plant itself. In that case the value 'nil' should be given.

9. Municipality

   Give the municipality in which the site is located by using the municipality codes given in Appendix 3.C. Make sure that it is the municipality appropriate to the site. It is not necessarily the same as that of the postal address.

10. Province

    Give the province in which the municipality shown in paragraph 9, above, is located. Refer to the provincial codes given in Appendix 3.D.

11. Control on the Air Quality

    Give the appropriate law under which the plant falls and through which agency this control is carried out. If this is not known, contact the project directorate. Use the codes in Appendix 3.E. For activities in harbors and by subcontractors, use the same code as for the plant itself.

12. Control on the Water Quality

    Give the agency which has control over the waste water discharges. If this is not known, contact the project directorate. Use the codes in Appendix 3.F. For activities in harbors and by subcontractors use the same code as for the plant itself.

13. Year of Recording or Update

    Use only the last two digits, e.g. 75 for 1975.

14. Contact Person in the Plant and Telephone Number

    The name and telephone number of the contact person(s) is given here.

2.2 POLLUTANTS FILE (not to be filled out by the data collectors)

The information in this file is recorded by the project directorate. It is directly recorded in computer card format.

The following rules hold:

1. Card Code

   The pollutants file code is 39002.

2. Type of Modification

   If the data recorded is new, fill in the value 1. If it is a modification of existing data, fill in the value 2. If data is to be removed from this component, fill in the value 3. For modification, the whole line in the card format must be filled in. For removal of data, fill in points 1 to 3 only.

3. Pollutant Number

   All pollutants are given a number, the first number being 0001.

4. Pollutant Grouping

   Use the codes given in Appendix 3.G.

5. Polluting Effect

   If the material is very polluting (such as soot or tar) fill in the value 1. If it is clearly not so, fill in the value 0. If its polluting effect is not known, leave blank.

6. Odor

   Fill in as for point 5, but for its odor. Mercaptans are very odorous, for instance.

7. Toxic Effect

   Fill in as for point 5, but for its toxicity. Some heavy metals and pesticides are very toxic.

8. Corrosive Effect

   Fill in as for 5, but for its corrosive effect. Strong acids and bases are very strongly corrosive materials.

9. Number of Carbon-Atoms

For pollutants of which the chemical composition is known, fill in the number of C-atoms in the molecule.

10. Number of Hydrogen-Atoms

Do the same as for 9, but for the number of H-atoms.

11. Number of Nitrogen-Atoms

Do the same as for 9, but for the number of N-atoms.

12. Number of Oxygen-Atoms

Do the same as for 9, but for the number of O-atoms.

13. to 18. Other Elements

For pollutants of which the chemical composition is known, up to six other elements can be given. This should be done in ascending atomic number. In the first two positions fill in the chemical symbol of the element in question (if it has only one letter, then only in the first position). In the third position fill in the number of atoms per element per molecule.

19. Name

Provide the most common chemical name for the material; in parenthesis following the name include the Geneva convention name for the compound. Start with the first box in the data format. The use of trade names should, if at all possible, be avoided.

20. Year of Recording or Update

Fill in only the last two digits of the year, e.g., use 75 for 1975.

2.3 INSTALLATION AND APPARATUS FILE

Questionnaire forms for this file should only be filled in for those installations which as a whole or through one of their apparati give rise to emissions. This is because the only purpose of the file is to store information on installations and apparati which cause emissions. The file does not stand on its own but serves as a supplement to the data stored in the emissions files.

A block diagram of the plant must be prepared before filling in the forms for the various installations and apparati. The block diagram will show the plant subdivided into installations, which should be more or less independently operating units. The installations which produce emissions should be numbered in the block diagram beginning with the number 001. A consecutive numbering system is preferred, although this is not essential. Those apparati within each installation which substantially contribute to the emissions of the installation should be numbered within the installation beginning with the number 01. Here also a consecutive numbering system is desired but not necessarily required.

The following rules must be kept in mind when subdividing and numbering installations and apparati:

a. An installation is a more or less independently functioning unit. Often it will be a unit which produces a certain product or semi-finished product. (See the code list in Appendix 3.H.) In many cases the installation will be a separate plant. In some industrial activities, for instance in the metal industry, several operations will overlap each other. In that case one should try to group together all activities of the same kind and collect them together as an installation (for instance, all machining operations in a production line should be collected together into one installation). For smaller plants one will have only a few installations to deal with, for instance the installation "office" (no. 1060), and one for the production line.

b. The differentiation between installations and apparati is made by the following: by recording an installation, one indicates why the activity is carried out; whereas, by recording an apparatus, one indicates how the activity is accomplished. Recording an installation is a matter of indicating the process; recording an apparatus is a matter of indicating the technical (mechanical) means by which the process is carried out.

c. Several types of installations have been arranged into groups in the code lists in Appendix 3.H. The first installation named in such a group is usually the so-called "general installation." This means it is a collection of two or more installations falling under the same grouping. One should only use this type of designation if there is indeed such a collection of different installations, and should not confuse it with the classification "other kinds" of installations mentioned at the end of each grouping. The use of the term "general installation" will be necessary if one knows only the total emissions of a number of different installations grouped by code list 3.H, and cannot determine (including estimating) individual emissions. See also point "g" below.

d. The installations for storage, transhipment and pipeline transport in code list H.2 in Appendix 3.H should only be considered as separate installations when they absolutely cannot be included in another installation. This will occur in cases of transhipment companies or for very extensive storage lots. In all other cases the storage and transhipment must be recorded as "apparati" (see codes in I.2) belonging to the installation for which the transhipment and storage is most closely connected (for instance the production installation or the first or last installation in a production line, if it is a question of several installations in series).

e. Water purification apparatus is considered to be a separate installation if:

- it is a question of biological purification, or
- the waste water treatment apparatus treats the water flows from two or more installations simultaneously.

In all other cases, purification apparati for gases and water are recorded in the emission files under gas purification type (see air pollution emissions file, points 22 and 23) or water purification type (see water pollution emissions file, points 21 and 22).

f. Groups of installations or apparati of one kind that simultaneously produce the same or nearly the same type of emission may be grouped under one installation or apparatus number, provided they are located within the same segment of the topographical map (refer to point 11). One should then give the number of installations grouped together (see point 6). For example, the combined valves of an installation or segment of an installation can be recorded as one apparatus. If the number is equal to or greater than 100, use the value 00 (i.e. 100) in point 6 but make a note, next to the boxes, of the exact number.

g. If certain emissions are only known for the sum of two or more installations and they cannot be separated even by estimation into separate installations, then the emissions for these installations may be recorded as a combination. It could thus occur that for certain emissions, two installations are recorded under their own installation number, but that for other emissions they are recorded as a combination with its own installation number. For indicating the "type of installation" for the combination, in some cases one could use the term "general" installations as mentioned in point "c" above. If this cannot be done, then the installation must be characterized by its corresponding plant function code. In those cases for "kind of installation" (see point 7 below), fill in a 0 followed by the 3-digit plant function code assigned to the plant in the plant file.

Once the block diagram and the numbering are completed, prepare for each of the numbered installations and apparati a questionnaire form according to the following instructions (points 1 to 16). Make sure that there is a data form for all installations numbered, even for those where only emissions from apparati within the installation have been recorded.

Next complete the data forms for the sources and emissions. (For instructions see par. 2.4 through 2.7.) If certain information is not immediately available, indicate this clearly on the form by putting a cross in the margin.

Remember when determining the desired accuracy of the various data requested that each item has varying importance as far as the inventory is concerned. The mass flow of the emission is the most important piece of data. On the contrary, the volume flow and the capacity are less important and thus one can be less accurate with these data. Also in checking the data forms, most attention should be put on the most important data. Aside from the above, the following rules apply when filling out the data forms for the installation and apparatus file:

1. Card Code

   The code for the installation and apparatus file is 39003.

2. Type of Modification

   If the information to be recorded is new, fill in the value 1. If it is a question of the modification of earlier data, fill in the value 2. If data must be removed from the file for this component, fill in the value 3. For modifications, fill in again all the data. For removal of data fill in points 1 to 5 only.

3. Plant Number

   Record the plant number assigned to the plant in the plant file.

4. Installation Number

For installations, record the number assigned to the installation according to the procedure mentioned above. For apparati fill in the number of the installation to which the apparatus belongs.

5. Apparatus Number

For entire installations fill in 00. Preferably, all apparati belonging to one installation should be numbered consecutively starting with the number 01. If an apparatus is recorded, also a data form must be prepared for the installation to which it belongs.

6. Number of Installations and Apparati

Whenever similar installations or apparati (i.e., installations which would have the same code number assigned in points 7 and 8) are operated simultaneously and in the same manner and are moreover located in the same sector of the topographical map, they can be considered as one unit. Report the number of such grouped installations.

If there is only one installation or apparatus, fill in 01 or leave blank.

7. Kind of Installation

Use the codes given in Appendix 3.H to indicate the nature of the installation or the nature of the installation to which a particular apparatus belongs. It is possible that a group of installations, for which emissions cannot be determined on an individual basis, will not be described in code list 3.H. In this case, one should fill in a 0 followed by the 3-digit plant function code assigned to the plant in the plant file. One should only use this procedure if no other solution to the problem is possible.

8. Kind of Apparatus

Use the code list given in Appendix 3.I to specify the nature of the apparatus. For data forms concerning installations, fill in 0000.

9. Nominal Capacity

Record, in units appropriate to the type of installation or apparatus, and which are listed in Appendix 3.H and 3.I, the nominal capacity of the installation or apparatus. By "nominal capacity" of an installation one means the maximum average production capacity in a period between two shutdowns. In the processing industry this capacity is usually called the "streamday capacity." Since installations often have been modified after being brought into production their nominal capacity can be appreciably higher than their design capacity.
Since the maximum average of an apparatus is usually not known, the "nominal capacity" must be interpreted to mean the design capacity, provided that no change in capacity has occurred by "debottlenecking". Should that be the case, one should report the new "design" capacity.
For a group of installations or apparati taken together, always report the total capacity of the group.
For the capacity of combinations of installations for which the Plant Function coding is needed to describe their nature (see point 7), use the units g/h . The capacity is always indicated by means of a 5-digit mantissa and exponent. Use only the exponents 0, 3, 6, or 9. For instance, 250×10^5 should be written with a mantissa 0025 and an exponent 6. Be careful that no errors occur when calculating the exponent, since an error here will always lead to serious errors in the results.

10. Units of Capacity

Fill in the number given in the column "units code" in Appendix 3.H (when recording installations) or in Appendix 3.1 (when recording apparati).

11. Location

Consult the topographical map to determine the square in which the installation or apparatus is located. Specify the lower left corner by the values indicated on the horizontal and vertical axes. Record these under "hor. km." and "vert. km.". Make sure the recording order is correct. If the numbers are filled in correctly, the number reported under "hor. km." will always be less than 300 and that for "vert. km." always greater than 300. Determine the location of the center of the of the installation in tens of meters from the point specified above by measuring the distance on the topographical map or on the ground plan of the plant.

If an apparatus is located not too far away from the center of an installation, then one may give it the same location as for the installation.

12. Name (an actual capacity)

Note the name commonly used in the plant itself for the installation or apparatus. If there is none, use the terminology given in the code listings in 3.H or 3.I. Make certain that it will be possible to identify the installation or apparatus by name within the plant. Be as specific as possible and if necessary give a supplementary description. Use any necessary (recognizable) abbreviations.

In case of installations, all boxes except two may be used for the recording of the name. The statement of the name of the installation therefore must not contain more that 30 letters, digits, punctuation marks and spaces. The last two boxes are used for the recording of the average actual production capacity during the time that the installation is in operation. For a further description of what is meant by "actual" refer to Appendix 4, para. 4.1. If an installation has different production capacity for various processes, then the weighted mean of the production capacities should be noted. Note that, in general, the term production capacity means the capacity during the time that the installation is actually in operation (and not averaged over hours of running and shutdown). However, for furnace installations which operate on an off-on cycle, an average is taken over the on and off periods (see the Introduction and point 10 of para. 2.6). For intermittent operations, such as lathing, welding, milling and cutting, the same type of average may also be taken. The production capacity is recorded as a percentage of the nominal capacity recorded in point 9 (N.B. not in tens of a percent, as is done on the data forms for the emissions file). If the percentage is equal to 100%, use the value 00. For apparati, the actual capacity is not given here. All 32 boxes may be used in giving the name of the apparatus.

13. Recording Agency

Use the code given in Appendix 3.K. If the recording agent is TNO, consult your ERL-identification card. The first digit of the number on it is the code number for the recording agency.

14. Recording Individual

Fill in the last two digits of the number on your ERL-identification card.

15. Year of Recording or Modification

Give the last two digits of the year, e.g. 75 for 1975.

16. Materials Handled

One records here the most significant materials handled in the installation or apparatus. This is done even if these materials are not emitted, such as natural gas used in a boiler installation. Since this data is not included in the computer card format, it does not have to be recorded in boxes.

2.4 AIR POLLUTION SOURCES FILE

A source of air pollution is defined as an orifice through which emissions pass into the atmosphere. It may also mean the entire area covered by an installation, e.g., when the emission concerns the leakages through the flanges of an installation. In contrast to the general usage of the word, a source is not the cause of the emission. The cause is the installation or the apparatus.

Sources can belong to the categories given in Appendix 3.L. All sources of air pollution within a plant should be numbered, preferably in consecutive order and beginning with 001.

It may happen that a source is so large, that it is located in two or more sectors of the topographical map. This may be the case for large storage areas. Then the source should be divided into parts with each part lying within a single 1 sq. km. square on the map. Each part should then be recorded as a separate source.

Smaller (less significant) sources of the same type which are situated very close to one another may be considered to be one source. The sum of the individual areas is recorded as the area of that source.

The following rules hold for the completion of the questionnaire forms:

1. Card Code

   For the Air Pollution Source file the code is 39004.

2. Type of Modification

   If the data to be recorded is new, fill in the value 1. If it is a modification of existing data, fill in the value 2. If data must be removed from the file, fill in the value 3.

   For modifications re-record all data. For removal of data complete points 1 to 4 only.

3. Plant Number

   Give the plant number assigned to the plant in the Plant file.

4. Source Number

   Number all sources of air pollution in the plant beginning with 001. Use of a consecutive numbering scheme is preferred. Avoid duplications and make, if needed, a list of the source numbers.

Make sure that large sources (such as storage yards) which are located in two or more squares of the topographical map are divided up into parts, each of which lie in a 1 km^2 sector of the map.

5. Kind of Source

Use the codes given in Appendix 3.L to characterize the kind of source.

6. Name

Record the name used in the plant to refer to the source. Use a maximum of 20 letters, digits, punctuation marks and spaces for this. Be as specific as possible in order to produce a unique identification. Use, if necessary, recognizable abbreviations.

7. Location

Identify the square on the topographical map in which the source is located. Specify the lower left corner by the values indicated on the horizontal and vertical axis, and record these under "hor. km." and "vert. km.". Locate by measurement on the topographical map or on the ground plan of the plant the location of the center of the source in units of tens of meters from the corner located above.

8. Geodesic Height

Determine from the topographical map the geodesic height of the terrain at the location of the source. Add 10 m and record the result on the data form. Make sure that all boxes have been filled in either with a digit or with zeros.

Example: - 5 m = 005

-15 m = 025

9. Geometric Height

Give the height of the source above ground in meters.

Example: 20 m = 020

10. Surface Area

Determine the surface area of the source, i.e., of the orifice through which the emission passes into the environment. For emissions from buildings by way of open windows and doors, this is the total surface area of these openings. Express the surface area in mm^2 and record the result in terms of a mantissa and exponent. Arrange the result so that the exponent has only the values 0, 3, 6, or 9. Thus, 250×10^5 mm^2 should be written with a mantissa 0025 and exponent 6. For sources with other than a vertical upward flow, the reporting of the order of magnitude is sufficient. Always check carefully the correctness of the value of the exponent since an error there always leads to severe errors in the final result.

If a number of emissions due to leakage are recorded in combination (e.g., the emissions resulting from all the leakages through the flange plates of an installation or part thereof), then the projected surface area must be reported as the source area.

11. Municipality

Give the number of the municipality in which the source is located. Use the municipal codes given in Appendix 3.C.

12. Recording Agency

Use the codes in Appendix 3.K for this. If the recording agency is the TNO, consult your identification card. The first digit of the number on this is the code number for the recording agency.

13. Recording Individual

Give the last two digits of the identification number.

14. Year of Recording or Modification

Give the last two digits of the year, i.e. 75 for 1975.

2.5 WATER POLLUTION SOURCES FILE

Sources of water pollution are defined as orifices through which waste water is discharged. These discharges can take place directly into the environment such as directly into surface water or into the ground, or indirectly into the environment such as through sewage systems and/or water purification installations. The various possibilities have all been listed in Appendix 3.M.

Discharge of liquid or solid wastes into adjacent surface water (not into the North Sea) should also be recorded as water pollution. This is a direct discharge with a "kinds of source" number of 1 or 2.

For a given plant all sources of water pollution, direct as well as indirect, must be numbered, preferably consecutively, beginning with 01.

The following rules apply for the completion of questionnaire forms:

1. Card Code
   For the Water Pollution Sources file the code number is 39006.

2. Type of Modification
   If the data to be recorded is new, fill in the value 1. If it is a modification of existing data, fill in the value 2. If data must be removed from the file, fill in the value 3.
   For modifications re-record all data. For removal of data complete points 1 to 4 only.

3. Plant Number
   Give the plant number assigned to the plant in the Plant file.

4. Source Number
   Label all sources of water pollution (direct as well as indirect) in the plant, preferably consecutively, beginning with 01. Avoid duplication.

5. Kinds of Sources
   Use the codes in Appendix 3.M to characterize the source.

6. Name
   Record the name of the source as used in the plant. Use a maximum of 20 letters, digits, punctuation marks and spaces. Be as specific as possible in order to avoid a misidentification. If necessary, use recognizable abbreviations.

7. Location

Find from the topographical map the square in which the source (discharge point) is located. Determine the values on the horizontal and vertical axes of the lower left corner of this square, and record these numbers under "hor. km." and "vert. km.". By measurements on the topographical map or on the ground plan of the plant, determine the position of the source in tens of meters measured from the point determined above. In the case of direct discharge (code numbers 1 to 4 in Appendix 3.M), the location is given as the location of the discharge into the environment, i.e. into the surface water or into the ground. In cases of so-called secondary discharges (Kind of Source number 2) the location is given where the minor (not mentioned in Appendix 3.0) watercourse enters the major surface watercourse which is listed in Appendix 3.0. Should the minor surface watercourse discharge into more than one major surface watercourse, see the instructions given under point 9 on page 26. In cases where dumping of wastes into surface watercourses takes place, the location of the discharge is given. For indirect discharges into installations outside the plant (code numbers 5, 6, and 8 in Appendix 3.M), the place or the approximate place at which the waste water leaves the plant's terrain should be given. For indirect discharges into other installations in the same plant, the location of the installation which receives the waste water should be given.

8. Water Purification Authority

If the source concerns a direct discharge into a watercourse not regulated by the central government (see the list of surface level watercourses in Appendix 3.0), or an indirect discharge into an installation of a water purification authority (e.g., a wastewater transport line or a purification installation), report the name of the purification authority (or the equivalent water control agency). Use the code lists in Appendix 3.N. If the source concerns an indirect discharge into another installation other than those under the direct control of water purification authority or a direct discharge into a watercourse controlled by the central government, fill in 00.

9. Receiving Surface Water

If the source concerns a direct discharge into surface water, give the name of the lake, canal, river, or brook into which the discharge occurs. Use the code lists in Appendix 3.0. For discharges which do not occur into surface water, fill in the value 0000.

In the case of a so-called secondary discharge (Kind of Source code number 2) it may be that the minor watercourse (not mentioned in Appendix 3.0) feeds into two or more listed major watercourses. This presents no problem if there is a preferential current direction for the minor watercourse. However, should the current direction vary, then all the watercourses mentioned in Appendix 3.0, to which the minor watercourse is connected, could be specified as the receiving surface water. In that case, one should record that watercourse which lies at the closest distance measured (over the length of the minor watercourse) from the point of the wastewater discharge into the minor watercourse.

10. Destination

For direct discharges fill in zeros. For indirect discharges into an installation inside or outside the plant itself, record the plant number and the installation number of the place of destination. If this is a water purification installation within the plant itself, then the plant code number of the plant and the installation number of the water purification installation is recorded. If it is a municipal sewage or other public utility installation, then these numbers can be obtained from the project directorate. Submit to the project directorate the name of the municipality in which the sewage (or other installation) system is located as well as the coordinates of the source. If the discharge goes to another plant, the numbers are also obtainable from the project directorate.

11, Municipality

Give the municipality in which the source is situated. Use the codes in Appendix 3.C.

12. Recording Agency

Use the codes in Appendix 3.K. If the recording agency is TNO, consult your identification card. The first digit of the number on this card is then the code number for the recording agency.

13. Recording Individual

Give here the last two digits of the identification number.

14. Year of Recording or Modification

Give here the last two digits of the year, e.g., 75 for 1975.

2.6 AIR POLLUTION EMISSIONS FILE

See first Appendix 4, para. 4.1 for instructions for recording emissions.

All independent emissions or series of periodically occurring emissions must, as far as possible, be recorded on separate questionnaire forms. Also, when a number of pollutants are released simultaneously, such as CO, SO_2, and NO_2 in combustion gases, each of these emissions must be recorded on its own questionnaire form.

Gas and oil-fired installations for heating normally work in an on-off cycle. If only annual figures are available, emissions are considered to be continuous, 24 hours per day, Monday through Friday, November through April (24 hr/day, 21 days/month, heating season November-April). The on and off nature is to be incorporated in the recording of "percentage of nominal capacity" (see point 10 below). This can be estimated from data on the nominal capacity, consumption of fuel, number of firing hours, efficiency and the heating coefficient of the fuel.

For radically intermittent procedures, such as often occurs with lathe work, welding, milling and cutting work, a method similar to that for furnaces with an off-on cycle may be used.

In general, emissions arising from leakages of flanges need not be recorded because of their relative insignificance. They must, however, be recorded in the case of extremely toxic or odorous pollutants. Local authorities should be consulted.

The following rules hold for the completion of the questionnaire forms:

1. Card Code

   For the Air Pollution emissions file the code number is 39005.

2. Type of Modification.

   If the data to be recorded is new, fill in the value 1. If it is a modification of existing data, fill in the value 2. If data must be removed from the file, fill in the value 3.
   For modifications re-submit all data. For removal of data complete points 1 to 7 and point 27.

3. Plant Number

   Give the plant number assigned to the plant in the Plant file.

4. Installation Number

Give the number of the installation which causes the emission, or to which the apparatus which causes the emission belongs.

5. Apparatus Number

Give the number of the apparatus which causes the emission. If the emission is produced by an entire installation, give the value 00.

5a. Name of the Process

Record the name of the process which produces the emission in question. This information is valuable if more than one process occurs during the year in an installation. This information is not fed into the computer, so that no "boxes" have been given on the questionnaire form.

For large plants it is advisable to record also the name of the installation and of the apparatus. This will simplify later discussions on data sheets.

6. Source Number

Give the number of the source which releases the emission from the plant and through which it enters the atmosphere.

7/8. Pollutant Number and Pollutants Group Number

Give the numbers of the pollutant emitted. Look these up in the pollutants list; if not listed, consult the project directorate. Consult the project directorate also if a pollutant is listed without a chemical formula; this will avoid misunderstandings. Note that the pollutant number and the pollutants group number are always related, and that the classification of a pollutant in a pollutants group may only be done by the project directorate.

Emissions of water vapor are recorded only if they are extensive (e.g., cooling towers and cooling basins).

It should be noted that the pollutants file may contain also mixtures of chemical compounds. The composition of them does not have to be known precisely provided that they are characteristic for the production process by which they are emitted. Such pollutants are also incorporated in one of the pollutants groups by the project directorate after consultation with the data collector.

9. Form of Pollutant

Use the code list in Appendix 3.P for this.

10. Capacity

Capacity is defined as the level at which the installation (or apparatus) operates when the emission recorded in point 11 occurs (i.e., during the process mentioned in point 5a). The capacity is expressed in tens of a percent of the nominal capacity recorded in point 9 of the Installation and Apparatus data file. As an example, 05 means that the installation (or apparatus) is operating at 50% of its nominal capacity during the time that emission is being released.

For gas and oil-fired boiler instructions there is the question of the on-off nature of the process, so that the capacity actually varies between 0 and 100%. For these installations, therefore, one gives the percentage of the time that the installations is in operation. This can be estimated from the capacity and the fuel consumption of the boiler.

11. Mass Flow

See Appendix 4, para. 4.1, for instructions pertaining to the recording of emissions. Record the mass flow of these emissions during the period(s) to be registered in points 19, 20, and 21. Make sure that the mass flow recorded is that which remains after any gas cleaning, and that as far as the determination of the mass flow is concerned, the pollutant in question is exactly the same as the one recorded in the pollutants file (e.g., in general, in the pollutants file water of crystallization is not incorporated in the formula). When recording the emissions from a collection of several similar installations or apparati which in the Installation and Apparatus file are entered under one single number, one should take the sum of the mass flows.

The mass flow is expressed in mg/h. Use the notation of mantissa and exponent. The exponent may only have the values 0, 3, 6, and 9. Thus a mass flow of 250 x 10^5 mg/h must be recorded with a mantissa 0025 and exponent 6. Check carefully the exponent given, since incorrect values there lead to severe errors. For furnace installations, report next to the boxes the nature and quantity of fuel consumed.

12. Standard Deviation in the Mass Flow

Record in percents the estimated standard deviation in the mass flow given in point 11 during the time that the emission is occurring. See Appendix 4, para. 4.2, for instructions on the calculation of the standard deviation. For boiler installations operating with an on-off cycle record the value 99%.

13. Volume Flow

In those situations where there is no vertical upward flow such as from chimneys, vertical pipes or cooling towers, the values 0000 and 0 may be recorded.

For cases where there is a vertical flow, calculate the total volume flow emitted by the source through which the effluent leaves the plant at the same conditions as for the mass flow given in point 11. Make sure that the total volume flow leaving the source is recorded, and not only that of the component for which the questionnaire is prepared. Calculate the value of the volume flow at 0°C and one atm pressure and express the result in cm^3/h. The recording is again with a mantissa and an exponent, while only exponent values of 0, 3, 6 or 9 may be used. Check carefully the value of the exponent since errors here will give rise to serious mistakes.

14. Standard Deviation in the Volume Flow

Record in percents the estimated standard deviation in the volume flow given in points 13 during the time that the emission occurs. See Appendix 4, para. 4.2 for instructions on the calculation of the standard deviation. For boiler installations with an on-off cycle record the value 99%.

15. Expected Mass Flow

Record the magnitude of the emission that the plant management expects after a 3-year period (see point 12). Use the code list in Appendix 3.Q.

16. Expected Volume Flow

Record the magnitude of the total volume flow that the plant management expects after a 3-year period (see point 13). Use the code list in Appendix 3.Q.

17. Temperature

Record the temperature in °C at which the total gas flow leaves the source. Account for any cooling that might occur in a tall chimney.

18. Mode of Operation

This data gives a more precise determination of the cause of the effluent. Use the code list in Appendix 3.R.

19. Frequency

The determination of the time during which the emission occurs is accomplished by means of a frequency and a duration. One should attempt to do this in a pragmatic way so that not too many questionnaire forms will have to be completed.

The frequency units given in the code list in Appendix 3.S should be used. (e.g., 03 3 = 3 times per day). For a continuous emission during the entire year one may enter the code 0 under "units"[1].

To translate days/week into days/month, use the following table:

1 day(s) / week = 4 days / month
2 " " " = 9 " " "
3 " " " = 13 " " "
4 " " " = 17 " " "
5 " " " = 21 " " "
6 " " " = 26 " " "
7 " " " = 30 " " "

20. Duration

Report the length of the time period(s) during which the emission occurs with the frequency reported in 19. For the applicable units refer to the codes in Appendix 3.T (e.g., 02 2 = during 2 minutes). Make sure that the recorded time duration always refers to a continuous emission period. It is not correct to record a duration within which a further qualification with the "period of time" (see point 21) would be applicable.

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[1] If an emission is recorded as being "continuous" this will be interpreted by the computer as being 8000 hours/year. The remaining 736 hours will be considered to be the time during which the installation is not normally in operation because of vacations, shut-downs, start-ups, cleaning, etc.

21. Period of Time

Record the period of time during which the emission with the frequency and duration recorded under 19 and 20 occurs or can occur. One uses the months of the year, the days of the week (Monday = 1, Sunday = 7), and the hours of the day. Note that the duration and the period of time are not necessarily identical. Take, for instance, an emission which occurs for one hour. It may be known that this hour always occurs between 16 and 17 hr. Thus, the duration and the period of time (in hours) is recorded as "01 3" and "16 to 17" respectively. In another case, it is only known that the emission occurs somewhere between 8 and 17 hr. In that case one should write "01 3" and "08 to 17". Note also that only the value "0 to 24 hr" (i.e., 00-24) can be given for the period of time if the duration in point 20 is expressed in days. It then does not make sense to speak about hours. Also only the values "0 to 24 hr" and "Monday to Friday" (i.e., 1-7) can be written if the duration in point 20 is given in months. In these cases the periods in question can be left blank.

A few examples of the periods of time are given below:

0102
15 = in January and February, from Monday to Friday, from 8.00 to 16.00 hr
0816

1505
33 = in May, on Wednesday, from 10.00 to 12.00
1012

22. Kinds of Gas Cleaning

Use the codes in Appendix 3.U to indicate the kinds of gas cleaning, if any, that occur just before the emission is released into the environment.

23. Efficiency

The efficiency of the gas purification system is given for the material reported in point 7. This is done in units of 0.1%. An efficiency of 95% would thus be recorded as 950.

24. Recording Agency

Use the code lists in Appendix 3.K. Should the recording agency be the TNO, use the first digit of the number given as identification number.

25. Recording Individual

Record here the last two digits of the identification number.

26. Type of Data Acquisition

Here one indicates how the emission was determined and what agency has played the most important role in this. Use the code lists in Appendix 3.V (e.g. 23 = one rough measurement by the TNO). Any calculation of the emissions using emission factors must be recorded as an estimation.

27. Record Identification Number

In case of modification or removal of existing data, the record identification number must be entered here. This number is given by the computer to all new records in order to identify any records having the same plant number, installation number, apparatus number, pollutant number, and source number.

28. Year of Recording or Modification

Give here the last two digits for the year, e.g. 75 for 1975.

2.7 WATER POLLUTION EMISSIONS FILE

See first appendix 4, para 4.1 for instructions as to the recording of emissions.

Also for waste water, all independent emissions as far as separately determinable, should be recorded on their own questionnaire.

In the inventory of water effluents one has besides direct discharges into the environment also indirect discharges. The latter are discharges into other installations within or outside the plant, such as a water purification installation or a municipal sewage system.

All emitted material should be recorded as "real pollutants," if at all possible. If of oxygen-binding compounds only COD, Kjeldahl-nitrogen and "precipitative matter" are known, these values may be recorded instead of "real pollutants." One should take care in those cases where one does know the emission of some "real pollutants," but where at the same time it has been included in an overall COD number, Kjeldahl-nitrogen number, and precipitative matter. The values of the COD-number etc. of the "real pollutant" must then be subtracted from the overall values before the latter are entered into the file.

For acids, bases and salts, sometimes the emission is known only in terms of its ionic content. For those cases one may record the material under consideration as ions.

The recording of heat in cooling or waste water should be made only if its value is larger than 0.5 MW per source. In this case, heat is recorded as the heat added to the water by the plant. It is expressed in Watts.

The following rules should be followed for the completion of the questionnaire forms:

1. Card Code

   For the Water Pollution emissions file the code is 39007.

2. Type of Modification

   If the data to be recorded is new, fill in the value 1. If it is a modification of existing data, fill in the value 2. If data must be removed from the file, fill in the value 3.

   For modifications re-submit all data. For removal of data complete points 1 to 6 and point 25.

3. Plant Number

Give the plant number assigned to the plant in the Plant file.

4. Installation Number

Give the number of the installation or of the installation belonging to the apparatus that produces the emission.

5. Apparatus Number

Give the number of the apparatus that produces the emission. If the emission is produced by an entire installation give the value 00.

5a. Name of the Process

Record the name of the process which produces the emission in question. This information is especially important if more than one process takes place in the installation during the course of the year. Since this information is not put into the computer, no boxes are given for it on the data sheets.

For large plants one should record also the name of the installation and of the apparatus. This will make later discussions over the data sheets simpler.

6. Source Number

Record the number of the source through which the waste water is released into the environment or into another installation.

7/8. Pollutant Number and Pollutants Group Number

Record the numbers belonging to the emitted pollutant. These code numbers are found in the pollutants list. Should they not be found there, consult the project directorate. Consult also the project directorate if a pollutant occurs in the lists without a chemical formula; this will avoid any misunderstanding. Note that the pollutant number and the pollutants group number are always related, and that the classification of a pollutant in a pollutants group may only be done by the project directorate.

Four types of pollutants can be distinguished when recording water emissions:

a. Real pollutants. These are chemical elements, chemical compounds, or combinations of compounds (see point 7/8 of para 2.6 for a discussion of mixtures). As far as possible, all these pollutants should be recorded.

b. If it is not possible to record compounds which combine with oxygen as real pollutants, then the recording of the COD, Kjeldahl-nitrogen and "precipitable matter" will be permitted.

c. Should the recording of acids, salts, and bases as such not be possible, then the recording of ions will be permitted.

d. Heat. This concerns the heat in cooling water, if relevant, in waste water. Heat emissions are only recorded if they are greater than 0.5 MW per source.

In the case of water softeners and demineralizers it is not sufficient to only record the added chemicals released into the environment, but one must also consider the minerals that are collected from the incoming water and that are released during recovery.

The effluents of sanitary facilities in a plant are not to be recorded.

9. Form of the Water Pollutant

Use the code list in Appendix 3.W.

10. Capacity

Capacity is defined as that level at which the installation or apparatus operates when the emission occurs (i.e. during the process named in point 5a). The capacity is expressed in tens of a percent of the nominal capacity recorded in point 9 of the data sheet for the Installation and Apparatus file. Thus 05 means that the installation (or apparatus) is operating at 50% of its nominal capacity during the period when the emission was produced.

11. Mass Flow or Heat Flow

See Appendix 4, para. 4.1 for instructions pertaining to the recording of effluents. Record here the mass flow during the time recorded in points 18, 19, and 20. Make sure that the mass flow is that flow that remains after any waste water purification (recorded in point 21), and that the recorded mass flow should be based on exactly the same material as recorded in the pollutants file (e.g., in general, one does not include the water of crystallization in the formula). When recording, the effluent from a group of several installations or apparati which in the Installation and Apparatus file are entered under one single number, one should take the sum of the mass flows.

Express the mass flow of "real pollutants," COD and Kjeldahl-nitrogen in mg/h. "Precipitable matter" is expressed in ml/h. If heat is released, then record the heat released by the plant into the watercourse in Watts.

Use the notation of mantissa and exponent, when the exponent is restricted to the values 0, 3, 6, and 9. A mass flow of 250×10^5 must thus be recorded with a mantissa of 0025 and an exponent 6. Check carefully the value of the exponent since incorrect results lead to serious errors.

12. Standard Deviation in the Mass or Heat Flow

Record in percents the estimated standard deviation in the mass or heat flow, recorded in point 11, during the time that the emission occurs. See Appendix 4, para. 4.1 for instructions pertaining to the calculation of this standard deviation.

13. Expected Mass or Heat Flow

Record the magnitude of the effluent that the plant management expect after a 3-year period. Use the code list in Appendix 3.0.

14. Volume Flow

Record the volume flow of waste water released by the installation or apparatus in l/h.

In many cases the volume flow per installation or apparatus will be unknown but instead a sum of the volume flows to one source. One should then attempt, as far as possible, to segregate the total flow over the various installations and apparati. One should report on the data sheets how this division took place. The volume flow should also be expressed with a mantissa and exponent. Make sure that the exponent is correctly recorded.

15. Standard Deviation in the Volume Flow

Record in percent the estimated standard deviation in the volume flow, referred to in point 14, during the time that the emission occurs. See Appendix 4, para. 4.1 for instructions pertaining to the calculation of this variation.

16. Expected Volume Flow

Record the magnitude of the volume flow that the plant management expects after a 3-year period. Use the code list in Appendix 3.Q.

17. Mode of Operation

Use here the code list in Appendix 3.R.

18. Frequency

Refer to the instructions in point 19 of the Air Pollution emissions file.

19. Length of Time

Refer to the instructions in point 20 of the Air Pollution emissions file.

20. Period of Time

Refer to the instructions in point 21 of the Air Pollution emissions file.

21. Type of Water Purification

Should the water purification equipment not need to be considered as a separate installation (see the introduction of para. 2.3 point 3), then the nature of the apparatus should be given here. Use the code list in Appendix 3.X.

22. Efficiency

Record the approximate efficiency of the water purification equipment for the pollutant named in point 7. This is done in units of 0.1%. Thus an efficiency of 95% is recorded as 950.

23. Recording Agency

Use the code list in Appendix 3.K. If the recording agency is the TNO, record the first digit of the identification number.

24. Recording Individual

Give the last two digits of the identification number.

25. Type of Data Acquisition

Here one indicates how the emission was determined and what agency has played the most important role in this. Use the code lists in Appendix 3.V (e.g. 23 = one rough measurement by the TNO). Any calculation of the emissions using emission factors must be recorded as an estimation.

26. Record Identification Number

In case of modification or removal of existing data, the record identification number must be entered here. This number is given by the computer to all new records in order to identify any records having the same plant number, installation number, apparatus number, pollutant number, and source number.

27. Year of Recording or Modification

Give the last two digits for the year, e.g. 75 for 1975.

Addendum 1

Questionnaire Forms

D - II, 42

1 - 2

EMISSIEREGISTRATIE

Paraaf teamleider:

Datum:

Bedrijvenbestand

1-5	1. Kaartcode	*	3 9 0 0 1
6	2. Mutatiesoort (A)	*	☐
7-12	3. Bedrijfsnummer	*	☐☐☐☐☐☐
13-15	4. Bedrijfstak (B)	*	☐☐☐
16-45	5. Naam		☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐
46-66	6. Adres		☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐
67-86	7. Woonplaats		☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐
87-91	8. Aantal werknemers		☐☐☐☐☐
92-94	9. Gemeente (C)	*	☐☐☐
95-96	10. Provincie (D)	*	☐☐
97	11. Toezicht lucht (E)	*	☐
98	12. Toezicht water (F)	*	☐
99-100	13. Jaar v. opn. of mut.	*	☐☐

14. Contactpersoon + tel. nr.

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EMISSION INVENTORY

Initials of group leader:

Plant File

Date:

1. Card Code
2. Type of Modification (A)
3. Plant Number
4. Plant Function (B)
5. Name
6. Address
7. Town
8. Number of Employees
9. Municipality (C)
10. Province (D)
11. Control on the Air Quality (E)
12. Control on the Water Quality (F)
13. Year of Recording or Modification
14. Contact Person in the Plant and Telephone Number

EMISSIEREGISTRATIE

Paraaf teamleider:

Datum:

Installatie- en apparatenbestand

1-5	1. Kaartcode	▪	3 9 0 0 3	1. Card Code
6	2. Mutatiesoort (A)	▪	☐	2. Type of Modification (A)
7-12	3. Bedrijfsnummer	▪	☐☐☐☐☐☐	3. Plant Number
13-15	4. Installatienummer	▪	☐☐☐	4. Installation Number
16-17	5. Apparaatnummer	▪	☐☐	5. Apparatus Number
18-19	6. Aantal install./app.		☐☐	6. Number of Installations and/or Apparti
20-23	7. Installatiesoort (H)	▪	☐☐☐☐	7. Kind of Installation (H)
24-27	8. Apparaatsoort (I)	▪	☐☐☐☐	8. Kind of Apparatus (I)
	9. Nominale capaciteit			9. Nominal Capacity
28-31	mantisse		☐☐☐☐	mantissa
32	exponent		☐	exponent
33	10. Eenheid v. cap. (J)		☐	10. Units of Capacity (J)
34-36	11. Ligging, hor. km		☐☐☐	11. Location, hor, km.
37-38	10 m		☐☐	10 m
39-41	vert. km		☐☐☐	vert. km.
42-43	10 m		☐☐	10 m
44-75	12. Naam		☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐	12. Name
76	13. Opname-instantie (K)	▪	☐	13. Recording Agency (K)
77-78	14. Opname-persoon	▪	☐☐	14. Recording Individual
79-80	15. Jaar v. opn. of mut.	▪	☐☐	15. Year of Recording or Modification

16. Gehanteerde stoffen

16. Material Handled

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EMISSION INVENTORY

Initials of group leader:

Date:

Installation and Apparatus File

EMISSIEREGISTRATIE

Paraaf teamleider:

Datum:

Bronnenbestand lucht

1-5	1. Kaartcode	39004	1. Card Code
6	2. Mutatiesoort (A)	☐	2. Type of Modification (A)
7-12	3. Bedrijfsnummer	☐☐☐☐☐☐	3. Plant Number
13-15	4. Bronnummer	☐☐☐	4. Source Number
16	5. Bronsoort (L)	☐	5. Kind of Source
17-36	6. Naam	☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐	6. Name
37-39	7. Ligging, hor. km	☐☐☐	7. Location, hor. km.
40-41	10 m	☐☐	10 m
42-44	vert. km	☐☐☐	vert. km.
45-46	10 m	☐☐	10 m
47-49	8. Geod. hoogte (m)+10 m	☐☐☐	8. Geodesic Height (m) + 10 m
50-52	9. Geom. hoogte (m)	☐☐☐	9. Geometric Height (m)
	10. Oppervlak (mm^2)		10. Surface Area (mm^2)
53-56	mantisse	☐☐☐☐	mantissa
57	exponent	☐	exponent
58-60	11. Gemeente (C)	☐☐☐	11. Municipality (C)
61	12. Opname-instantie (K)	☐	12. Recording Agency (K)
62-63	13. Opname-persoon	☐☐	13. Recording Individual
64-65	14. Jaar v. opn. of mut.	☐☐	14. Year of Recording or Modification

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EMISSION INVENTORY

Initials of group leader:

Air Pollution Sources File

Date:

volgens ERL-regels. Geen basis voor heffingen.

1 -

EMISSIEREGISTRATIE

Paraaf teamleider:

Datum:

Bronnenbestand water

1-5	1. Kaartcode	3 9 0 0 6	1. Card Code
6	2. Mutatiesoort (A)	☐	2. Type of Modification (A)
7-12	3. Bedrijfsnummer	☐☐☐☐☐☐	3. Plant Number
13-14	4. Bronnummer	☐☐	4. Source Number
15	5. Bronsoort (M)	☐	5. Kind of Source (M) 6. Name
16-35	6. Naam	☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐	
36-38	7. Ligging, hor. km	☐☐☐	7. Location, hr. km.
39-40	10 m	☐☐	10 m
41-43	vert. km	.☐☐	vert. km.
44-45	10 m	☐☐	10 m
46-47	8. Zuiveringschap (N)	☐☐	8. Water Purification Authority (N)
48-51	9. Ontv. oppervl. water (O)	☐☐☐☐	9. Receiving Surface Water (O)
	10. Bestemming		10. Destination
52-57	bedrijfsnummer	☐☐☐☐☐☐	plant number
58-60	installatienummer	☐☐☐	installation number
61-63	11. Gemeente (C)	☐☐☐	11. Municipality (C)
64	12. Opname-instantie (K)	☐	12. Recording Agency (K)
65-66	13. Opname-persoon	☐☐	13. Recording Individual
67-68	14. Jaar v. opn. of mut.	☐☐	14. Year of Recording or Modification

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EMISSION INVENTORY

Initials of group leader:

Water Pollution Sources File

Date:

1 - 6

EMISSIEREGISTRATIE
EMISSION INVENTORY
Emissiebestand lucht (Air Pollution Emissions File)

Paraaf teamleider:
(Initials of group leader)
Datum:
(Date:)

1-5	1. Kaartcode	• 3 9 0 0 5	1. Card Code
6	2. Mutatiesoort (A)	• ☐	2. Type of Modification (A)
7-12	3. Bedrijfsnummer	• ☐☐☐☐☐☐	3. Plant Number
13-15	4. Installatienummer	• ☐☐☐	4. Installation Number
16-17	5. Apparaatnummer	• ☐☐	5. Apparatus Number
	5a. Naam v.h. proces		5a. Name of the Process
18-20	6. Bronnummer	• ☐☐☐	6. Source Number
21-24	7. Stofnummer	• ☐☐☐☐	7. Pollutant Number
25-26	8. Stofgroep	• ☐☐	8. Pollutants Group
27	9. Emissievorm (P)	• ☐	9. Form of Air Pollutant (P)
28-29	10. Capaciteit (10%)	☐☐	10. Capacity (10%)
30-33	11. Massastroom, mantisse	• ☐☐☐☐	11. Mass Flow, mantissa
34	(mg/h) exponent	• ☐	(mg/h) exponent
35-36	12. Spreiding massastr.(%)	☐☐	12. Standard deviation in the Mass Flow (%)
37-40	13. Volumestroom, mantisse	• ☐☐☐☐	13. Volume Flow, mantissa
41	(cm^3/h) exponent	• ☐	(cm^3/h) exponent
42-43	14. Spreiding volumestr.(%)	☐☐	14. Standard deviation in the Volum Flow (%)
44	15. Verwachte massastr.(Q)	• ☐	15. Expected Mass Flow (Q)
45	16. Verwachte volumestr.(Q)	• ☐	16. Expected Volume Flow (Q)
46-48	17. Temperatuur (°C)	• ☐☐☐	17. Temperature (°C)
49-50	18. Emissiemodus (R)	• ☐☐	18. Mode of operation (R)
51-52	19. Frequentie, waarde	☐☐	19. Frequency, value
53	eenh.(S)	• ☐	units (S)
54-55	20. Tijdsduur, waarde	☐☐	20. Duration, value
56	eenh. (T)	☐	units (T)
57-60	21. Tijdsopgave, maand	☐☐ t/m ☐☐	21. Period of Time, month
61-62	dag	☐ t/m ☐	day
63-66	uur	☐☐ tot ☐☐	hour
67-68	22. Type gasreiniging (U)	☐☐	22. Kind of Gas Cleaning (U)
69-71	23. Rendement gasr. (0,1%)	☐☐☐	23. Efficiency of Gas Cleaning (0.1
72	24. Opname-instantie (K)	• ☐	24. Recording Agency (K)
73-74	25. Opname-persoon	• ☐☐	25. Recording Individual
75-76	26. Soort bepaling (V)	• ☐☐	26. Type of data acquisition (V)
77	27. Volgnummer	☐	27. Record identification Number
78-79	28. Jaar v. opn. of mut.	• ☐☐	28. Year of Recording or Modificati

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volgens [illegible]-regels. Geen basis voor heffingen.

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1 - 7

EMISSIEREGISTRATIE
(EMISSION INVENTORY)

Paraaf teamleider:
(Initials of group leader:)
Datum:
(Date:)

Emissiebestand water (Water Pollution Emissions File)

1-5	1. Kaartcode	* 3 9 0 0 7	1. Card Code
6	2. Mutatiesoort (A)	* ☐	2. Type of Modification (A) [redacted]
7-12	3. Bedrijfsnummer	* ☐☐☐☐☐☐	3. Plant Number
13-15	4. Installatienummer	* ☐☐☐	4. Installation Number
16-17	5. Apparaatnummer	* ☐☐	5. Apparatus Number
	5a. Naam v.h. proces		5a. Name of the Process [redacted]
18-19	6. Bronnummer	* ☐☐	6. Source Number
20-23	7. Stofnummer	* ☐☐☐☐	7. Pollutant Number [redacted]
24-25	8. Stofgroep	* ☐☐	8. Pollutants Group
26	9. Emissievorm (W)	* ☐	9. Form of Water Pollutant (W)
27-28	10. Capaciteit (10%)	☐☐	10. Capacity (10%)
	11. Massa-of warmtestroom (mg/h, ml/h of Watt),		11. Mass Flow or Heat Flow (mg/h, ml/h or Watt),
29-32	mantisse	* ☐☐☐☐	mantissa
33	exponent	* ☐	exponent
34-35	12. Spreiding massa- of warmtestroom (%)	☐☐	12. Standard deviation in the Mass Flow or Heat Flow (%)
36	13. Verwachte massa- of warmtestroom (Q)	* ☐	13. Expected Mass Flow or Heat Flow
37-40	14. Volumestroom, mantisse	* ☐☐☐☐	14. Volume Flow, mantissa
41	(1/h) exponent	* ☐	(1/h) exponent
42-43	15. Spreiding vol. stroom (%)	☐☐	15. Standard deviation in the Volume Flow (%)
44	16. Verwachte vol. stroom (Q)	* ☐	16. Expected Volue Flow (Q)
45-46	17. Emissiemodus (R)	* ☐☐	17. Mode of operation (R)
47-48	18. Frequentie, waarde	☐☐	18. Frequency, value
49	eenh. (S)	* ☐	units (S)
50-51	19. Tijdsduur, waarde	☐☐	19. Duration, value
52	eenh. (T)	☐	units (T)
53-56	20. Tijdsopgave, maand	☐☐ t/m ☐☐	20. Period of time, month
57-58	dag	☐ t/m ☐	day
59-62	uur	☐☐ tot ☐☐	hour
63-64	21. Type waterzuivering (X)	☐☐	21. Type of Water Purification (X)
65-67	22. Rendement water z. (0,1%)	☐☐,☐	22. Efficiency of Water Purification (0.1%
68	23. Opname-instantie (K)	* ☐	23. Recording Agency (K)
69-70	24. Opname-persoon	* ☐☐	24. Recording Individual
71-72	25. Soort bepaling (V)	* ☐☐	25. Type of data acquisition (V)
73	26. Volgnummer	☐	26. Record identification Number
75	27. Jaar v. opn. of mut.	* ☐☐	27. Year of Recording or Modificatio

Addendum 2

Computer Card Format for the Pollutants File

ERL
(EMISSION INVENTORY)

Stoffenbestand
(POLLUTANTS FILE)

Blad nr.

1 *	2 *	3 *	4 *	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20 *
kaart code	mutatiesoort	stof. nummer	stofgroep	verontreinigend	stinkend	toxisch	etsend	C at.	H at.	N at.	O at.	stofnummer 1 aantal	stofnummer 2 aantal	stofnummer 3 aantal	stofnummer 4 aantal	stofnummer 5 aantal	stofnummer 6 aantal	naam	jaar v. opname of mutatie
1 CARD CODE	2 TYPE OF MODIFICATION	3 MATERIAL NUMBER	4 MATERIAL GROUPING	5 POLLUTING	6 ODOUROUS	7 TOXIC	8 CORROSIVENESS	9 CARBON ATOMS	10 HYDROGEN ATOMS	11 NITROGEN ATOMS	12 OXYGEN ATOMS	13 MATERIAL NUMBER 1 14 NUMBER						NAME	YEAR OF RECORDING OR MODIFICATION
3 9 0 0 2																			
3 9 0 0 2																			

De met * gemerkte velden moeten steeds geheel worden ingevuld

Vertrouwelijk. Alleen voor personeel aangewezen volgens ERL-regels. Geen basis voor heffingen.

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Addendum 3

Codes[*)]

[*)] Not presented in full. Code lists C, D, N and O are left out completely, while code lists B and G are presented in an abbreviated form.

A. TYPE OF MODIFICATION

1. New Data
2. Modification of Existing Data
3. Removal of Existing Data

B. PLANT FUNCTION

000 AGRICULTURE AND FISHING

- 010 AGRICULTURE AND HORTICULTURE
  - 011 Farming and Stockbreeding
  - 012 Horticulture
  - 013 Parks and Gardening
  - 014 Agrarian Support Industries

- 020 FORESTRY
  - 020 Forestry

- 030 FISHING
  - 030 Fishing

100 MINERAL EXTRACTION

- 110 COAL MINES
  - 110 Coal mines

- 120 PETROLEUM AND NATURAL GAS EXPLORATION AND EXTRACTION
  - 120 Petroleum and Natural Gas Exploration and Extraction

- 190 OTHER MINERAL EXTRACTION
  - 191 Sand and Gravel Extraction
  - 192 Salt Extraction
  - 199 Any other Mineral Extraction

INDUSTRY

200 FOODS AND ALLIED PRODUCTS INDUSTRY

- 201 Slaughterhouses and Meat Processing Industry
- 202 Dairy and Milk Derivatives Industry
- 203 Fish Processing Industry
- 204 Flour mills, Barley and Rice Hulling Mills and similar industries
- 205 Sugar Industry
- 206 Margarine and other Vegetable and Animal Oils Industry
- 207 Vegetable and Fruit Processing Industry
- 208 Bread, Rusk, Cake and Biscuit Industry
- 209 Cocoa, Chocolate and Confectionery Industry
- 211 Starch and Starch Derivatives Industry
- 212 Forage Industry
- 213 Other kinds of Foods Industry
- 214 Alcohol Plants and Distilleries
- 215 Beer Breweries and Malthouses
- 217 Tobacco Processing Industry

etcetera

E. CONTROL ON THE AIR QUALITY

0 Plant does not fall under the Air Pollution Act or the Public Nuisance Act.

1 Plant falls under the Air Pollution Act; control by the province.

2 Plant falls under the Air Pollution Act; control by the central government.

3 Plant falls under the Public Nuisance Act; control by the municipality.

4 Plant falls under the Public Nuisance Act; control by the province. (this includes all municipal activities)

5 Plant falls under the Public Nuisance Act; control by the central government.

F. CONTROL ON THE WATER QUALITY

0 no control

1 controlled only by the central government

2 controlled by the provincial government

3 controlled only by the local water purification authority

4 controlled only by the municipality

5 controlled by the central governement and the provincial government or local water purification authority

6 controlled by the municipality and the provincial government or local water purification authority

7 controlled by the central government and the municipality

8 controlled by the central government and the provincial government and the local water purification authority

G. POLLUTANTS GROUP (assigned only by the project directorate)

All pollutants have been classified according to a material grouping. Pollutants which could be classified into several groups must be put into the most appropriate group on the basis of its environmental hygienic effect. Regularly occurring mixtures of material have also been included in the grouping.

Elements ans inorganic compounds

01 Aluminium and its organic compounds
02 Antimony " " " "
03 Arsenic " " " "
etcetera

Organic Compounds

50 Saturated aliphatic hydrocarbons up to C_3
51 Unsaturated aliphatic hydrocarbons up to C_3
52 Aliphatic hydrocarbons greater than C_3
53 Monocyclic hydrocarbons
etcetera

Special Groups

98 Ions
99 Water quality analyses

H. KINDS OF INSTALLATIONS

This code is divided into groups and sub-groups (see pages H-1-1 and following pages). In general the first installation mentioned in a subgroup will be the "general installation". After the name will appear the expression "in general". This code for an installation should only be used for a collection of installations mentioned in the sub-group. One should use the coding for a collection of installations only when the effluents from each individual installation cannot be obtained. In order to simplify the determination of the appropriate group or sub-group, the following summary might be useful:

H.1 General installations, offices, canteens, etc.

- energy generation in the form of heat, electricity or pressure
- water preparation
- waste water treatment
- repair and maintenance shops
- offices, canteens, cleaning-up areas, etc.
- laboratoria
- pilot plants and testing installations

H.2 Storage, shipment and pipeline transport

- general cargo
- liquid and gaseous fuels
- liquid and gaseous chemical and solvents (not in gas bottles)
- liquid foodstuffs and liquid raw materials for foodstuffs
- liquid wastes
- other liquid or gaseous materials
- pourable materials in sealed containers
- materials pourable in a continuous pour
- pipeline transport
- sewage systems

H 3 The mining and purification of minerals
- petroleum and natural gas
- coal
- other minerals

H 4 The processing of petroleum
- refining of petroleum
- petroleum products
- containerization of petroleum products

H 5 The manufacture of industrial gases and coal derivatives

H 6 The manufacture of inorganic chemicals

H 7 The manufacture of petrochemicals and other raw organic materials
- aliphatic hydrocarbons
- cyclic hydrocarbons
- alcohols
- glycerol, glycols, epoxides and ethers
- phenols
- aldehydes and ketones
- carbonic acids and acidic anhydrides
- esters
- nitrogen compounds
- halogenated hydrocarbons
- sulphur compounds

H 8 The manufacture of polymers
- thermoplasts
- thermoharders
- elastomers

H 9 The manufacture of finished chemical products
- pigments and dyes
- medical supplies and cosmetics
- washing and cleansing supplies
- other chemical products
- finishing of other chemical products

H 10 The manufacture of foodstuffs and luxury foods

H 11 The manufacture of metals and of metal products and machinery
- preparation and shaping of metals
- metal surface finishing
- plating of metals or of other materials onto metal
- assembly and construction

H 12 Manufacture and electrotechnical goods

H 13 Manufacture of construction materials, earthenware and glass
- ceramic goods
- non-ceramic construction materials
- glass and glass products

H 14 Manufacture of fibres, textiles and textile goods
- fibres
- textiles
- textile goods

H 15 Manufacture of paper, paper goods and graphics materials and photo-developing materials
- paper
- paper goods
- graphic materials
- photo-developing materials

H 16 Processing of wood, synthetic materials, rubber and leather
- wood
- synthetic materials
- rubber
- hides and leather

H 17 Miscellaneous manufacturing activities

H 18 Supporting industries

H.4. The processing of petroleum

code		units code	units
1300	The refining of petroleum in general	2	g/h of supplied matter
1301	De-salination of petroleum	"	"
1302	Distillation of petroleum or its fractions	"	"
1303	De-sulphurizing of petroleum or its fractions	"	"
1304	Thermal cracking of petroleum or its fractions	"	"
1305	Catalytic cracking of petroleum or its fractions	"	"
1306	Alkylation of petroleum or its fractions	"	"
1307	Polymerization of petroleum or its fractions	"	"
1308	Catalytic reforming of petroleum or its fractions	"	"
1319	Other processes on petroleum (excluding nrs. 1320 to 1339)	"	"
1320	The manufacture of petroleum products, in general	2	g/h of product
1321	Blending of gasoline	"	"
1322	Manufacture of other fuels	"	"
1323	Manufacture of lubricating oils and paraffin wax	"	"
1324	Manufacture of asphalt	"	"
1325	Manufacture of solvents and chemical raw materials (only by separation out of products mentioned in nrs. 1300 to 1319, and not by chemical reaction. For these see the codes under H.5 and H.9).	"	"
1339	Manufacture of other petroleum products	"	"
1340	The bottling of petroleum products, in general	2	g/h of product
1341	The filling of bottled gas	"	"
1342	The bottling of other petroleum products	"	"

H.11 Preparation of metals and the manufacture of metal products and machines

code			units code	units
2100	Preparation and shaping of metals, in general	for solid and fluid forming processes see nrs. 2105 etc.	2	g/h of total material minus recycling
2101	Manufacuture of pig iron		"	"
2102	Manufacture of ferrometals		"	"
2103	Manufacture of aluminium		"	"
2104	Manufacture of other non-ferrometals		"	"
2105	Rolling of steel		5	Watts of installed power
2106	Rolling of aluminium		"	"
2107	Rolling of non-ferrometals		"	"
2108	Drawing of steel wire		"	"
2109	Drawing of copper wire		"	"
2110	Drawing of other metal wires		"	"
2111	Casting of iron and steel		2	g/h of total material minus recycling
2112	Casting of aluminium		"	"
2113	Casting of other non-ferrometals		"	"
2114	Forging		5	Watts of installed power
2115	Processes involving metal, milling and honing		"	"
2116	Chemical milling and electroforming		2	g/h of removed or applied material
2117	Welding and joining processes (for gases see the conversion table in "Metal Industry Emission Factors")		5	Watts of installed power
2118	Powder sintering		2	g/h of product
2119	Preparation of forms and molds		2	g/h of forming material
2129	Other metal-forming processes		2/5	g/h or Watts
2130	The finishing of metal surfaces, in general (excluding plating)		2	(see the conversion table in Metal Industry Emission Factors
2131	Sandblasting, shotpeening, deburring and grinding		"	
2132	Hardening		"	"
2133	Cleaning, de-greasing, pickling, phosphating and chromating		"	"
etcetera				

I. KINDS OF APPARATUS

This code is divided into the following groups and subgroups:

I 1. Technical processing apparatus
  - separating apparatus
  - size reduction apparatus
  - agglomeration and prilling apparatus
  - mixers
  - evaporators
  - crystallizers
  - heat exchangers, cooling apparatus, pasteurizers, etc.
  - processing tanks and reservoirs, and electrolysis cells
  - fittings
  - flanges

I 2. Storage, transport, filling, rinsing and analysis apparatus
  - storage facilities
  - transporting apparatus
  - filling and rinsing apparatus
  - analysis apparatus

I 3. Waste water treatment apparatus
  - mechanical
  - chemical
  - biological

I 4. Ovens, power generating apparatus, burners and smoke generators
  - ovens
  - Power generating apparatus
  - burners
  - smoke generators

I 5. Shaping apparatus
- machining processes
- metal forming processes
- foundry apparatus
- welding and cutting apparatus
- spinning apparatus

I 6. Surface treatment apparatus
- Cleaning, de-greasing and staining apparatus
- chromating, phosphating, etc.
- Hardening apparatus
- lacquering and painting apparatus
- enamelling apparatus
- plating of metal layers
- plating of synthetic material and rubber layers
- other apparatus for the treatment of surfaces

I 7. Textile machines
- Spinning apparatus
- weaving apparatus
- machines for the finishing and improvement of textiles
- machines for the ready-made industry

I.2 Storage, transport, filling, rinsing and analysis equipment

code		units code	units
5200	Gas container, gas cylinder	3	l of useful volume
5201	Tank for liquid gas	"	"
5202	Open tank	"	"
5203	Completely closed tank	"	"
5204	Atmospheric tank with a fixed roof (without vents)	"	"
5205	Tank with a fixed roof with under and over pressure vents	"	"
5206	Tank with floating roof	"	"
5207	Tank with fixed roof and internal floating roof	"	"
5208	Tank with fixed roof and blanketed liquid	"	"
5209	Tank for liquids with variable vapor space	"	"
5210	Drum storage	"	"
5211	Open cargo storage area	"	"
5212	Closed cargo storage area (e.g. silos)	"	"
5213	Bag storage	"	"
5219	Other storage	"	"
	Transporting equipment		
5220	Duct	2	g/h of material
5221	Moving belt	"	
5222	Pneumatic transport duct	"	"
5223	Ditch for rain water and/or slops	0	no statement
5224	Pump (liquids)	4	l/h of liquid
5225	Compressor	4	l/h of gas[1)]
5226	Ventilator	"	"
5227	Vacuum pump (including steam injectors)	"	"
5228	Cars or ships	3	l of useful volume
5239	Other transporting equipment	2/4	g/h of material or l/h

etcetera

[1)] at normal temperature and pressure

J. UNITS OF CAPACITY

0 not specified
1 g
2 g/h
3 l
4 l/h (for gases at STP)
5 Watt
6 number
7 number/hour
8 cm^2/h
9 cm

K. RECORDING AGENCY

This is the agency that completes the questionnaire form:

1 TNO (obtain from the identification number)
2 Ministry of Public Health and Environmental Hygiene
3 RIZA
4 Province
5 Water Authority
6 Water Purification Authority
7 Municipality
8 TNO (obtain from identification number)
9 TNO (obtain from identification number)

L. KINDS OF AIR POLLUTION SOURCES

1. Chimney or pipe with vertical upward flow (without a cap or something similar)
2. Chimney or pipe without vertical upward flow
3. Other emissions from installations (not in buildings)
4. Emissions from buildings, other than from stacks or pipes

M. KINDS OF WATER POLLUTION SOURCES

1. Direct discharge into surface water
2. Secondary discharge into surface water through minor watercourses not listed in code list 0.
3. Direct discharge onto land (e.g. by distribution over the land or through seepage).
4. Direct discharge into deep wells
5. Indirect discharge into municipal sewage systems
6. Indirect discharge into the waste water transport system of a water authority
7. Indirect discharge into water purification installations within the plant itself
8. Indirect discharge to another plant

P. FORM OF EFFLUENT RELEASED INTO THE OPEN AIR

1 Gas without mixing with environmentally-present gases such as air, N_2, CO_2, or water vapour
2 Gases mixed with air or other environmentally-present gases
3 Material whose particle size is mainly less than or equal to 10 micron
4 Material whose particle size is mainly greater than 10 micron
5 Material whose particle size is unknown
6 Liquid droplets, mist, aerosol

Q. EXPECTED MASS, VOLUME, OR HEAT FLOW

0 will decrease to zero

1 about 0.01 of the present value

2 about 0.1 of the present value

3 about the same as the present value

4 about 3 times the present value

5 about 10 times or greater than the present value

R. MODE OF OPERATION

00 not applicable or unknown

For effluents from combustion processes (also for driers, naphta crackers,etc.)

01 combustion of natural gas
02 combustion of other gases
03 combustion of oil with sulphur content less than 1% (e.g. HBO-I)
04 combustion of oil with sulphur content from 1 to 2% (e.g. HBO-II)
05 combustion of oil with sulphur content from 2 to 3%
06 combustion of oil with sulphur content from 3 to 4%
07 combustion of oil with sulphur content from 4 to 5%
08 combustion of oil with sulphur content from 5 to 6%
09 combustion of oil with sulphur content greater than 6%
10 combustion of coal
11 combustion of soft coal, wood and peat
12 combustion of gasoline
13 combustion of diesel oil
19 combustion of other fuels

For effluents from processes other than combustion processes

20 normal plant operation (including daily cleaning operations, possible regeneration, etc. during which time the installation or apparatus continues normal operation)
21 starting-up of the installation or apparatus
22 shutting-down of the installation or apparatus
23 Cleaning of the installation or apparatus during which time the installation or apparatus is not normally operating
24 regularly occurring breakdowns
29 other processing conditions

For effluents arising from storage, shipping and transport

30 filling or emptying of storage tanks (with fixed or floating roof)
31 expansion or evaporation from storage tanks (with fixed or floating roof)
32 shipment to sheds, storage yards or rail yards
33 loading of sea-going ships
34 loading of lighters
35 loading of road and rail transport
36 ballasting of ships
37 cleaning of ships
38 cleaning of other means of transport
39 cleaning of storage and shipping facilities

5. UNITS OF FREQUENCY

0 continuous emission throughout the year

1 per minute

2 per hour

3 per day

4 per month

5 per year

T. UNITS OF TIME

1 second
2 minute
3 hour
4 day
5 month

U. KINDS OF GAS CLEANING

00 no gas cleaning

Gravity separation

01 settling chamber

04 other separators using gravity forces

Inertial (centrifugal) separation

05 cyclone

06 multicyclone

07 circulating flow separator

14 other inertial separators

Electrostatic precipitator

15 dry electrostatic precipitator

16 dry electrostatic precipitator with dust removal

17 wet electrostatic precipitator

18 wet electrostatic precipitator with mechanical dust removal

19 other electrostatic precipitator

Cloth filters

20 filter mat (dry)

21 filter mat (damp)

22 filter - continuous belt

23 filter cloth with mechanical cleaning

24 filter cloth with pneumatic cleaning

29 other cloth filters

Deep bed filters

30 Grindbed filter

31 wax filter

34 other deep bed filters

Etcetera

V. TYPE OF DATA ACQUISITION

This indicates how the emission data were acquired (i.e. by whom and in what manner) (e.g. measured, calculated or estimated)

first position:

1 measured by the plant
2 measured by TNO
3 measured by others

second position:

1 estimation (e.g. through an emission factor)
2 calculation
3 one rough measurement (possible error greater than 20%)
4 one accurate measurement (possible error less than 20%)
5 measurements carried out on a regular basis
6 continuous measurements

W. FORM OF WATER POLLUTANT

0 not applicable or unknown
1 in solution
2 suspended solid matter
3 precipitating solid matter
4 floating solid matter
5 suspended liquids (e.g. as an emulsion)
6 precipitating liquids
7 floating liquids

X. TYPE OF WATER PURIFICATION EQUIPMENT

NOTE: Biological purification and purification of water originating from more than one installation must always be handled as a separate installation in the Installation file. For all other cases use the codes below:

first position:

0 no mechanical water treatment
1 grid for coarse wastes
2 sand basin or settling tank
3 grease or oil separator (not 4, 5 or 6)
4 API separator
5 corrugated plate interceptor (CPI)
6 parallel plate interceptor
7 sifting machine
8 flotation apparatus
9 other mechanical water treatment apparatus

second position:

0 no chemical or physical-chemical water treatment
1 coagulation or flocculation
2 neutralization or precipitation (treatment with alkali or acid)
3 decontamination (treatment with oxidation or reduction means, perhaps followed by neutralization)
4 other chemical or physical-chemical treatments

Addendum 4

Miscellaneous Instructions pertaining to the Recording Process

4.1 EMISSIONS AND CAPACITIES TO BE RECORDED

For the inventory of air and water emissions the actual values of the effluents and the related data (such as the capacity of installations and apparati) must be recorded. With the exception of the cases to be mentioned below, the "actual value" means: the value corresponding to the year immediately preceding the "year of recording or modification". The year to which the recorded data belong will be called the "recorded year".

In cases where the recording takes place in a certain region (e.g. a province during one long period), one "year of recording or modification" as well as one "recorded year" can be prescribed, even when the inventorying covers more than one year. As an example, for the complete recording in the province of Zuid-Holland it has been agreed that 1974 will be the "recorded year" and 1975 the "year of recording or modification".

The following special cases could occur:

a. Changes brought about during or after the "recording year":
In this case the emissions are recorded as they are after the change has occurred, but always at the production level in the "recorded year".

b. New constructions or changes in an existing plant, for which the plans have been prepared and which will be in operation before the end of the "year or recording or modification" or before the end of the recording period (for the cases of recording during one long period in a province or part thereof): In this case the emissions and the relevant conditions are recorded such as they would expected to be after the commissioning or modification of the installation. If there is some certainty that after new installations have been commissioned, existing installations will be shut down, then the latter need not be registered.

c. New construction or modifications, which will only be in operation after the end of the "year of recording or modification" or after the end of the recording period (in cases of recording during one long period in a province or part thereof), or in cases where the development phase has not been completed at the moment of recording:
Emissions in these cases ought not to be included in the recording, except as a modification or substitution in the "expected mass or volume flow".

Make sure that for installations one always records the actual production capacity on the appropriate installation data form also. This is recorded in the last 2 boxes reserved on the form for the name of the installation. The rules above hold also for this actual production capacity.

4.2 Calculation of the Standard Deviation of the Mass and Volume Flow

The standard deviation noted on the data forms refers to the variation in time of the emission and not the accuracy of the measured or estimated effluent. In general only a rough guess can be made of the standard deviation.

The following approximation may be used for a calculation of the standard deviation of an emission:

1. For emissions which vary in a gaussian fashion or nearly so, the standard deviation may be calculated, if there are n measurements, by the formula:

   $S = A\,w$ where: s = standard deviation
   w = difference between the highest and the lowest values of the n measurements
   A = factor dependent on n (see table below)

   For large values of n use the formula:

   $$s = W/4$$

   By using the value for the average amount of the emission, the standard deviation can now be expressed as a percentage of this average value

   TABLE The factor A as a function of the number of measurements

n	A	n	A	n	A
2	0,88	9	0,34	16	0,28
3	0,59	10	0,32	17	0,28
4	0,48	11	0,32	18	0,27
5	0,43	12	0,31	19	0,27
6	0,39	13	0,30	20	0.27
7	0,37	14	0,29		
8	0,35	15	0,29		

2. Should the emission of an on-off system (such as for a gas or oil-fired boiler) be recorded as a constant emission , then the standard deviation would be 100% and should be recorded as 99%.

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ANNEX I

Names and Addresses of Panel Members (as of Fall 1978)

R. D. Bauman	Environmental Protection Agency (OAQPS - SASD - ESB - MD - 12) Research Triangle Park USA - 27711 North Carolina
A. Berger	Institut d'Astronomie et de Géophysique Université Catholique de Louvain 2, Chemin du Cyclotron B - 1348 Louvain la Neuve
A. Braig	Battelle Institut Am Römerhof 35 D-6000 Frankfurt 90
P. J. Choquette	Air Pollution Control Directorate Environment Canada Cdn - Ottawa, Ont. K I A IC8
R. Dams	University of Gent Institute Nuclear Sciences Proeftuinstraat 86 B - Gent 9000
C. De Wispelaere	Diensten voor Programmatie van het Wetenschapsbeleid Wetenschapsstraat 8 1040 Brussel
J. Frank	Rheinisch-Westfälischer TÜV Steubenstraße 53 D - 4300 Essen
F. Gerold	TÜV Rheinland Postfach 10 17 50 D - 5000 Köln 1
B. Gutsche	Institut für Geophys. Wissenschaften Freie Universität Thielallee 50 D - 1000 Berlin 33
K. E. Joerss	Umweltbundesamt Bismarckplatz 1 D - 1000 Berlin 33
D. Jost	Umweltbundesamt Bismarckplatz 1 D - 1000 Berlin 33

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T. Schneider	RIJKS Institut voor de Volksgesondheit P. O. Box 1 NL - Bilthoven
B. Sivertsen	Norwegian Institute for Air Research P. O. Box 130 (NILU) N - 2001 Lilleström
O. Skogvold	Norwegian Institute for Air Research P. O. Box 130 (NILU) N - 2001 Lilleström
J. Tikvart	Environmental Protection Agency (OAQPS - MDAD + DM + 14) Research Triangle Park USA 27711 North Carolina
H. E. Turner	Air Quality and Inter-Environmental Research Branch 4905 Dufferin St. Atmospheric Environment Service Cdn - Downsview (Toronto) Ont. M 3 H 5 T 4
V. Vent-Schmidt	Deutscher Wetterdienst Frankfurter Str. 135 D - 6050 Offenbach
L. H. J. Wachters	BM - TNO P. O Box 541 NL - Apeldoorn
E. Weber	Bundesministerium des Innern Graurheindorfer Str. 198 D - 5300 Bonn 7
M. L. Williams	Warren Spring Laboratory P. O. Box 20 Gunnels Wood Road GB - Stevenage Hertfordshire SG 1 2 BX

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W. Klug	TH Darmstadt Institut für Meteorologie Hochschulstraße 1 D - 6100 Darmstadt
L. Kropp	TÜV Rheinland Postfach 10 17 50 D - 5000 Köln 1
M. Kwizak	Air Quality and Inter-Environmental Research Branch 4905 Dufferin St. Atmospheric Environment Service Cdn - Downsview (Toronto) Ont. M 3 H 5 T 4
E. Lahmann	Bundesgesundheitsamt Corrensplatz 1 D - 1000 Berlin 33
L. E. Niemeyer	Environmental Protection Agency ESRL (MD-80) Research Triangle Park North Carolina 27711 USA
H. Meinl	Dornier System Postfach D - 7990 Friedrichshafen
C. Morawa	Umweltbundesamt Bismarckplatz 1 D - 1000 Berlin 33
F. Nieuwstadt	Koninklijk Nederlands Meteorologisch Instituut Utrechtseweg 297 NL - De Bilt 2664
J. C. Oppeneau	Ministere de la Culture et de l'Environnement Service d'Affaires Scientifiques 14 Bvd. du Général Leclerc F - 92521 Neuilly/Seine
B. Reilhac	Ministere de la Culture et de l'Environnement Secretariat d'Etat a l'Environnement 14 Bvd. du Général Leclerc F - 92521 Neuilly/Seine
L. Santomauro	Csservatorio Meteorologico Brera Via Brera 28 I - 20121 Milano

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ANNEX II

NATO/CCMS Documents on the First Air Pollution Pilot Study (available at: NATO/Committee on the Challenges of Modern Society, NATO Headquarters, Brussels, Belgium)

AIR POLLUTION (No. 5)

Proceedings of the 2nd Meeting of the Expert Panel on Air Pollution Modeling, (26 - 27 July 1971, Paris, France). Out of stock

AIR POLLUTION (No. 6)

Guidelines to Assessment of Air Quality (Revised)

APPENDIX A	Assessment of Air Quality in Ankara (February 1973)
APPENDIX B	Assessment of Air Quality in St. Louis (February 1973)
APPENDIX C	Assessment of Air Quality in Frankfurt (June 1974)
APPENDIX D	Assessment of Air Quality in Oslo (February 1973)
APPENDIX E	Assessment of Air Quality in the South Holland Region (December 1973)

AIR POLLUTION (No. 7)

Quality Criteria for Sulphur Oxides (November 1971). Out of stock

AIR POLLUTION (No. 8)

Air Quality Criteria for Particulate Matter (November 1971). Out of stock

AIR POLLUTION (No. 10)

Air Quality Criteria for Carbon Monoxide (June 1972)

AIR POLLUTION (No. 12)

Control Techniques for Sulphur Oxide Air Pollutants (October 1973)

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AIR POLLUTION (No. 13)

Control Techniques for Particulate Air Pollutants
(October 1973)

AIR POLLUTION (No. 14)

Proceedings of the 3rd Meeting of the Expert Panel on Air
Pollution Modeling
(2 - 3 October, 1972, Paris)

AIR POLLUTION (No. 15)

Air Quality Criteria for Nitrogen Oxides (June 1973)

AIR POLLUTION (No. 18)

Control Techniques for Carbon Monoxide Emissions from Stationary
Sources (October 1973)

AIR POLLUTION (No. 19)

Control Techniques for Hydrocarbon and Organic Solvent Emissions
from Stationary Sources (October 1973)

AIR POLLUTION (No. 20)

Control Techniques for Nitrogen Oxide Emissions from Stationary
Sources (October 1973)

AIR POLLUTION (No. 29)

Air Quality Criteria for Photochemical Oxidants and Related
Hydrocarbons (February 1974)

AIR POLLUTION (No. 30)

Proceedings of the 4th Meeting of the Expert Panel on Air Pollution Modeling, (28 - 30 May 1973, Oberursel, Germany)

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AIR POLLUTION (No. 33)

Final Report (May 1974)

AIR POLLUTION (No. 35)

Proceedings of the 5th Meeting of the Expert Panel on Air Pollution Modeling (4 - 6 June 1974, Roskilde, Denmark)

AIR POLLUTION (No. 41)

First Follow-up Report (December 1975)

AIR POLLUTION (No. 50)

Second Follow-up Report (December 1976)

AIR POLLUTION (No. 67)

Third Follow-up Report (November 1977)

AIR POLLUTION (No. 96)

Fourth Follow-up Report (October 1978)

AIR POLLUTION (No. 6, Appendix C revised)

Assessment of Air Quality in Frankfurt (December 1977)

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ANNEX III

NATO/CCMS Documents on the Pilot Study on Air Pollution Assessment Methodology and Modeling
(available at: NATO/Committee on the Challenges of Modern Society, NATO Headquarters, Brussels, Belgium)

Air Pollution (No. 42)

Proceedings of the 6th International Technical Meeting on Air Pollution Modeling and its Application
(24 - 26 September 1976, Frankfurt/Main, Germany)

Air Pollution (No. 51)

Proceedings of the 7th International Technical Meeting on Air Pollution Modeling and its Application
(7 - 10 September 1976, Airlie House, USA)

Air Pollution (No. 70)

Bibliography on Grey Literature on Air Quality Modeling, Part I (Applied Models) (October 1977)

Air Pollution (No. 71)

Air Quality Management Systems (AQMS) (October 1977)

Air Pollution (No. 88)

Bibliography on Grey Literature on Air Quality Modeling, Part II (New Modeling Techniques) (October 1978)

Air Pollution (No. 89)

Glossary of Terms Generally Used in Air Pollution Assessment Methodology and Modeling (October 1978)

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Air Pollution (No. 80)

Proceedings of the 8th International Technical Meeting on Air Pollution Modeling and its Application
(20 - 23 September 1977, Louvain-la-Neuve, Belgium)

Air Pollution (No. 99)

Introduction to Air Quality Modeling (October 1978)

Air Pollution (No. 100)

Air Pollution Emissions Projecting (October 1978)

Air Pollution (No. 101)

Uses and Needs for Air Quality Modeling (May 1979)

Air Pollution (No. 102)

Fundamentals for the Application of a Gaussian Plume Model
(April 1979)

Air Pollution (No. 104)

Air Pollution Emissions Inventory Systems
(October 1978/July 1979)

APPENDIX A:	Emissions Inventory in Belgium
APPENDIX B:	Emissions Inventory in Canada
APPENDIX C:	Emissions Inventory in Germany, Federal Republic of
APPENDIX D:	Emissions Inventory in The Netherlands
APPENDIX E:	Emissions Inventory in Norway
APPENDIX F:	Emissions Inventory in the United States of America

Air Pollution (No. 106)

Practical Demonstration of Multiple Source Urban Air Quality Modeling (Gaussian Plume) (August 1979)

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Air Pollution (No. 71, Revised)

Air Quality Management Systems (AQMS) (April 1979)

Air Pollution (No. 105)

FINAL REPORT (October 1979)

Air Pollution (No. 103)

Proceedings of the 9th International Technical Meeting on Air Pollution Modeling and its Application
(28 - 31 August, 1978, Toronto, Canada)

Air Pollution (No. 108)

Proceedings of the 10th International Technical Meeting on Air Pollution Modeling and its Application
(23 - 26 October, 1979, Roma, Italy)